API DK Lahari

(An official publication of API DK Chapter)

June 2021. VOL.1 ISSUE NO.4 Published Quarterly

VACCINE NO PANACEA; COVID-19 FAR FROM OVER!

Dr. Chakrapani M
Editor in Chief

Dr. B Sadananda Naik
Executive Editor

Dr. Kishan Delampady
Production Editor

www.apidk.org

DISCLAIMER

ALL CONTENTS IN THE MAGAZINE ARE THE VIEWS OF THE AUTHORS AND NOT OF THE EDITORIAL BOARD OR THE ASSOCIATION.

PRESIDENT'S MESSAGE

Warm greetings to you.

I am honored to write a few words in this 'Lahari' - quarterly e-magazine of API DK chapter.

Lahari started in September 2020, and this is the fourth issue.

Present edition has a number of intellectual and practical articles by eminent authors.

Hoping for the best utilization of this edition of Lahari, I conclude with gratitude to the authors, editorial board and magazine committee members.

Dr Ganesh Khandige
Professor of medicine
AJ Institute of Medical Sciences and Research Center
Mangaluru
23-6-2021

VOICE OF EDITORS

Dear Colleagues,

We are happy to present the 4th issue of API-DK LAHARI, the official publication of API-DK chapter. The editorial team is extremely grateful to the former president of our association Dr B.M. Venkatesh whose brain child this e-magazine is and his able secretary Dr Archana Bhat for all the support and encouragement during the year 2020-21 and take this opportunity to thank the new office bearers for year 2021-22 with Dr Ganesh Khandige as the president and Dr Kishan Delampady as the secretary for bestowing their confidence and trust on us.

As the cover page depicts, the pandemic is still on, in spite of availability of variety of vaccines, everyone needs to be cautious and follow allthe covid appropriate behavior. As Dr Sudhindra Rao M writes in his theme article presented in this issue, emergence of variants of Covid-19 is of concern and high consequence with their ability to evade human immunity acquired against the native strain through vaccination.

We are happy that there are interesting and informative non-medical topics in this issue to break the chain of monotonous medical information. As an important policy change, we have included the writeups on the topics presented by various guest speakers in our API DK chapter monthly meetings. We sincerely, hope that you will find this issue as interesting and useful as our previous issues.

DR CHAKRAPANI M – EDITOR IN CHIEF

DR B. SADANANDA NAIK--EXECUTIVE EDITOR

OUR EDITORIAL TEAM

Editor's message I/C scientific content	**DR CHAKRAPANI M** EDITOR IN CHIEF 
Co-ordination of editors I/C View point section	**DR B.SADANANDA NAIK** Executive editor 
i/c production, page setting, design, receiving all the write ups and forwarding to appropriate section editors/ information	**DR ARCHANA BHAT** PRODUCTION EDITOR  **DR KISHAN DELAMPADY** CO PRODUCTION EDITOR 
i/c news and views [NON ACADEMIC ARTICLES] section, obituaries, Member's accomplishments	**DR CHRISTOPHER C. PIAS** SECTION EDITOR 
Academic Articles	**DR ARCHITH BOLOOR** SECTION EDITOR 
P.G. write ups	**DR AKSHATHA NAYAK** SECTION EDITOR 
Journal scan- Glimpses on leading research	**DR B. SADANANDA NAIK** **DR ANURAG BHARGAV** SECTION EDITORS 

MEDICO LEGAL CORNER	**DR RAMACHANDRA BHAT** SECTION EDITOR 
QUIZ	**DR SURESH** 
NON-ACADEMIC ARTICLES	**DR ANITHA SEQUIRA**  **DR ASHRAF** 
EDITORIAL BOARD MEMBER (EX PRESIDENT -API 2020)	**DR BM VENKATESH** 

SECRETARY'S REPORT

Greetings from API D.K. Chapter.

The new office bearers of API D.K.Chapter for the term 2021-2022, with Dr Ganesh Khandige as President, Dr Kishan Delampady as secretary and Dr Rajesh Rai as treasurer took over the charge from April 2021 onwards. New Executive committee was formed and welcomed for the term 2021-2022.

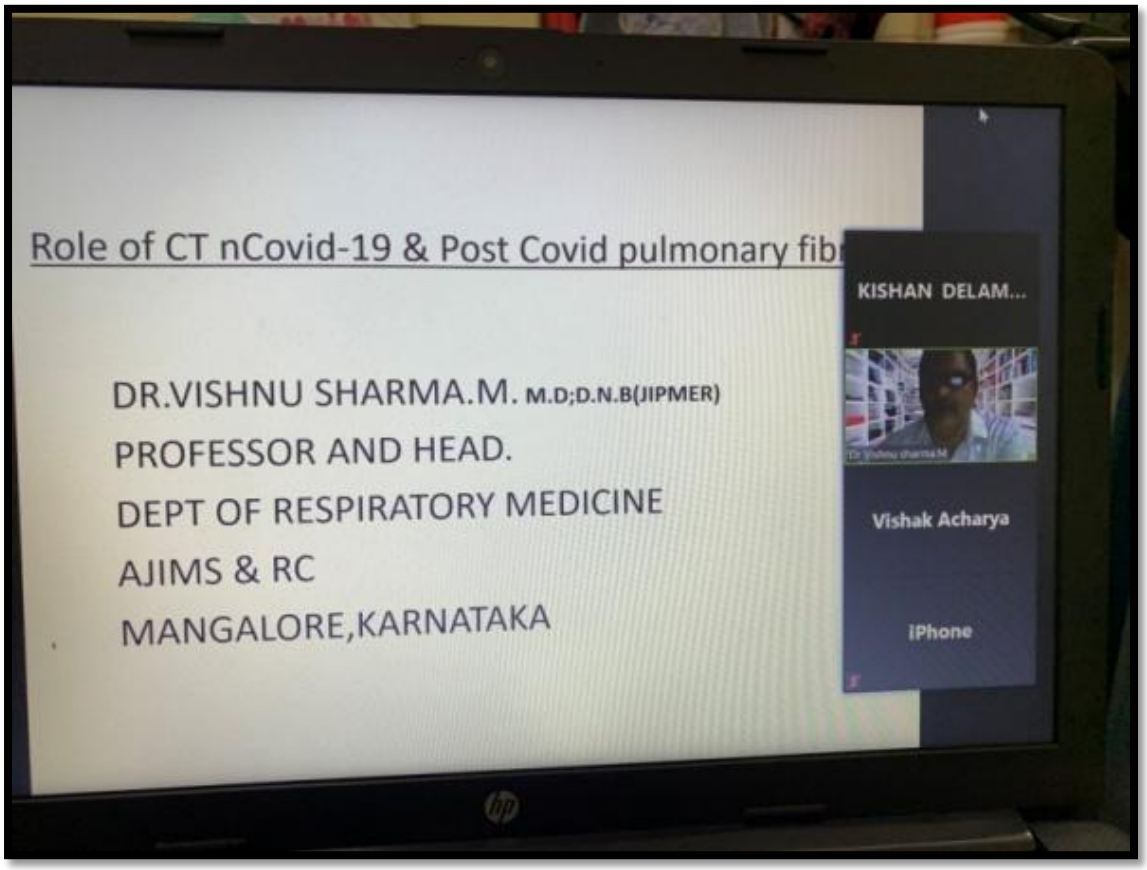
API DK chapter hosted the monthly meeting on April 16, 2021 at Ocean Pearl, Kodialbail, Mangalore.Dr Mohan Pai gave homage message for Dr H A Ballal, which was followed by period of silence in respect for thedeparted soul.The scientific agenda had two talks.Dr Rajiv Lochan, consultant HPB& Transplant surgeon, Aster RV hospital, Bengaluru gave an interestinglecture on "Who needs liver transplant & what happens to those who have it?." Dr Uday Nayak, Professor Medicine, AJIMS and Dr Raghavendra Prasada, consultant Gastroenterologist, AJ Hospital, Mangalore moderated the session.Dr Pavan Yadav, consultant Interventional pulmonologist, Aster RV hospital, Bengaluru gave a talk on"Lung Transplantation in chronic lung diseases".Dr B.A. Shetty, Professor Medicine, AJIMS and DrHarsha DS, Associate professor of Pulmonology, AJIMS, Mangalore moderated the session.The monthly meeting was attended by 40 delegates.

In view of the lockdown from the month of April onwards due to 2nd wave of COVID -19, the official meetings were cancelled. We hosted online monthly meeting webinar on May 21, 2021 at zoom platform.Dr Rakshith Shetty, consultant neurosurgeon AJ Hospital, Mangalore gave an interesting talk on"Traumatic brain injury: current concepts, management and controversies." Dr Saurabh Rai, consultantinterventional neurologist, AJ Hospital, Mangalore

moderated the session.The monthly meeting was attended by 30 delegates, concluded withquestion and answer sessions.

The monthly meeting on May 21, 2021 was conducted online by API DK chapter at zoom platform. Dr Vishnu Sharma, Prof and Head, Dept. of pulmonary medicine, AJIMS, Mangalore gave talk on “Role of CT Scan in covid19 and post covid lung fibrosis.”
Dr Vishaka Acharya, Prof, Dept. of pulmonary medicine, KMC, Mangalore moderated the session. The monthly meeting was attended by 45 delegates and was followed by stimulating discussion.


SCIENTIFIC AGENDA
Topic :
TRAUMATIC BRAIN INJURY :
Current Concepts,
MANAGEMENT AND CONTROVERSIES.
Guest Speaker
Dr. Rakshith Shetty
MBBS, MCh (NIMHANS)
Fellowship in Skull Base Neurosurgery (Washington, USA)
Fellowship in Cerebrovascular Surgery (Washington, USA)
Consultant Neurosurgeon (Brain & Spine)
AJ Hospital & Research Centre
Moderator
Dr. Saurabh Rai
MBBS, MD, DM (Neurology)
Fellowship in Neurovascular interventions (SNVI)
Interventional Neurologist
AJ Hospital & Research Centre


Role of CT nCovid-19 & Post Covid pulmonary fib
DR.VISHNU SHARMA.M. M.D;D.N.B(JIPMER)
PROFESSOR AND HEAD.
DEPT OF RESPIRATORY MEDICINE
AJIMS & RC
MANGALORE,KARNATAKA
KISHAN DELAM...
Vishak Acharya
iPhone

I am extremely honoured and humbled to take the responsibility of API Secretary and Production editor of this magazine API LAHARI. I extend my sincere thanks to all our members who have contributed to this issue.

Dr Kishan Delampady,
API DK Secretary, 2021-22
Consultant Endocrinologist, AJ Hospital, Mangalore.

CALL FOR ARTICLES

Readers are hereby requested to submit their articles for the next issue.

Submit to : editorapidk2020@gmail.com

Author instructions@page 89

COVID 19 – VACCINES AND VARIANTS

"I'd much rather have a vaccine than have this virus" – Paul A Volberding, MD

INTRODUCTION:

COVID 19 pandemic & development of vaccines are going on in an unprecedented pace around the globe. Since its first reporting in December 2019 in Wuhan, China it has spread to all corners of globe within few months and continues to cause devastating outbreaks. At the same time scientific & medical community considered vaccination as one of important tools to counter this pandemic and several vaccines were rolled out in record time from different countries.But the virus is trying to be ahead of human efforts by trying to evade the vaccine induced immunity through mutations.

The below picture shows the time taken for developing vaccines for some the infectious diseases, compared to which COVID 19 vaccine became a reality in few months' time.

COVID-19 VARIANTS:

Like all viruses COVID19 causing SAARS CoV-2 also under goes mutations over period of time. During replications new viral nucleic acid formed can have minor variation from parent which are called mutations.[1] If these changes confirm any advantages to the virus, then it can lead to natural selection via survival benefit. One of the benefits may be an ability to evade the human immunity acquired against the native strain through vaccination. As Baylor quoted'Yep, I've got plenty of people I can infect, and the more I replicate, the more I can mutate.' [2]The variants caused by mutations can be classified as variants of interest, variants of concern & variants of high consequence.[3]

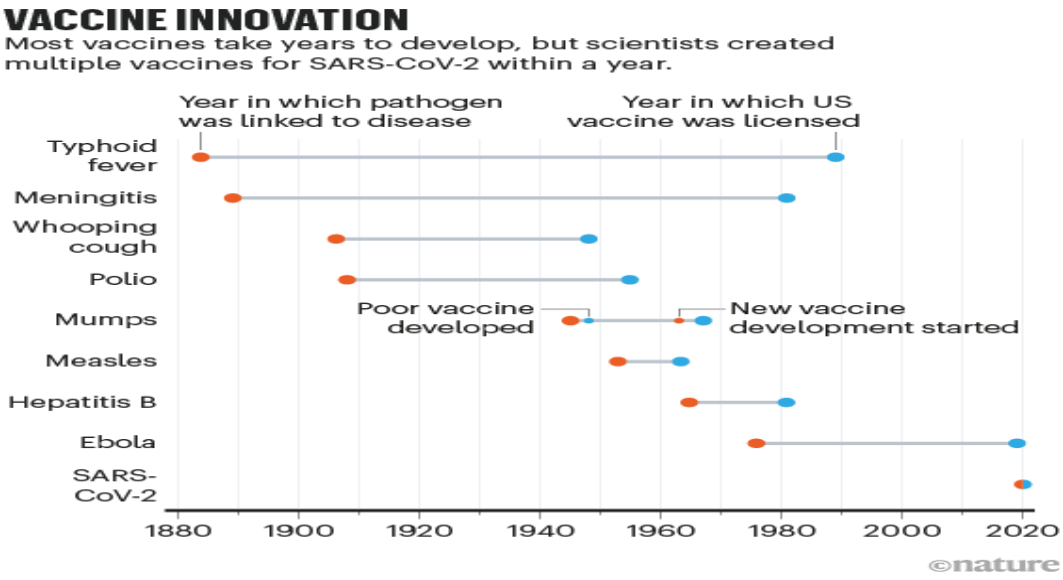


Fig1. Ref:https://www.nature.com/articles/d41586-020-03626-1

Variant of Interest

A variant with specific genetic markers that have been associated with changes to receptor binding, reduced neutralization by antibodies generated against previous infection or vaccination, reduced efficacy of treatments, potential diagnostic impact, or **predicted** increase in transmissibility or disease severity.

Possible attributes of a variant of interest:

- Specific genetic markers that are predicted to affect transmission, diagnostics, therapeutics, or immune escape
- Evidence that it is the cause of an increased proportion of cases or unique outbreak clusters

Name	First detected	Possible effects
B.1.525 (20A/S:484K)	United Kingdom/Nigeria – December 2020	• Potential reduction in neutralization by some monoclonal antibody treatments • Potential reduction in neutralization by convalescent and post-vaccination sera
B.1.526 (20C/S:484K) IOTA	United States (New York) – November 2020	• Reduced susceptibility to the combination monoclonal antibody treatment • Reduced neutralization by convalescent and post-vaccination sera
B.1.526.1 (20C)	United States (New York) – October 2020	• Potential reduction in neutralization by monoclonal antibody treatments [7] • Potential reduction in neutralization by convalescent and post-vaccination sera
B.1.617 (20A)	India – February 2021	• Potential reduction in neutralization by monoclonal antibody treatments • Reduced neutralization by post-vaccination sera
B.1.617.1-3 (20A/S:154K) DELTA	India – October-December 2020	• Potential reduction in neutralization by monoclonal antibody treatments • Potential reduction in neutralization by post-vaccination sera
P.2 (20J) ZETA	Brazil – April 2020	• Potential reduction in neutralization by monoclonal antibody treatments • Reduced neutralization by post-vaccination sera

Variant of Concern

A variant for which there is **evidence** of an increase in transmissibility, more severe disease (e.g., increased hospitalizations or deaths), significant reduction in neutralization by antibodies generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostic detection failures.

Possible attributes of a variant of concern:

In addition to the possible attributes of a variant of interest

- Evidence of impact on diagnostics, treatments, or vaccines
    - Widespread interference with diagnostic test targets
    - Evidence of substantially decreased susceptibility to one or more class of therapies
    - Evidence of significant decreased neutralization by antibodies generated during previous infection or vaccination
    - Evidence of reduced vaccine-induced protection from severe disease
- Evidence of increased transmissibility

Evidence of increased disease severity

Name	First detected	Possible effects
B.1.1.7 (20I/501Y.V1) ALPHA	United Kingdom	• ~50% increased transmission • Potential increased severity based on hospitalizations and case fatality rates • No impact on susceptibility to EUA monoclonal antibody treatments • Minimal impact on neutralization by convalescent and post-vaccination sera
B.1.351 (20H/501.V2) BETA	South Africa	• ~50% increased transmission • Significantly reduced susceptibility to the combination monoclonal antibody treatment • Reduced neutralization by convalescent and post-vaccination sera

B.1.427 (20C/S:452R) EPSILON	United States-(California)	• ~20% increased transmissibility • Modest decrease in susceptibility to the combination monoclonal antibody treatments • Reduced neutralization by convalescent and post-vaccination sera

B.1.429 (20C/S:452R)	United States-(California)	• ~20% increased transmissibility • Reduced susceptibility to the combination e monoclonal antibody • Reduced neutralization by convalescent and post-vaccination sera
P.1 (20J/501Y.V3) GAMMA	Japan/ Brazil	• Significantly reduced susceptibility to the combination of monoclonal antibody treatment • Reduced neutralization by convalescent and post-vaccination sera

Variant of High Consequence

A variant of high consequence has clear evidence that prevention measures or medical countermeasures (MCMs) have significantly reduced effectiveness relative to previously circulating variants.

Possible attributes of a variant of high consequence:

In addition to the possible attributes of a variant of concern

- Impact on Medical Countermeasures (MCM)
    - Demonstrated failure of diagnostics
    - Evidence to suggest a significantly reduction in vaccine effectiveness, a disproportionately high number of vaccine breakthrough cases, or very low vaccine-induced protection against severe disease
    - Significantly reduced susceptibility to multiple Emergency Use Authorization (EUA) or approved therapeutics
    - More severe clinical disease and increased hospitalizations

Currently there are no SARS-CoV-2 variants that rise to the level of high consequence.

COVID-19 VACCINES:

Currently, there are four main types of COVID-19 vaccine: nucleic acid (mRNA and DNA), viral vector, protein subunit, and inactivated virus.[4]

Current COVID-19 vaccines are based on the SARS-CoV-2 spike protein, which the virus uses to bind to and infect host cells, of the original Wuhan-hu-1. But the emerging "variants of concern"—deemed so because they appear to be more transmissible or deadlier than the wild-type SARS-CoV-2—contain mutations in the spike protein, spurring vaccine efficacy concerns. [2]

The South Africa trials found lower vaccine efficacy compared with trials in other countries where B.1.351 wasn't dominant. On testing serum samples from individuals immunized with 2 doses of the Pfizer-BioNTech vaccine against recombinant viruses containing some or all of the spike protein mutations found in theB.1.351variant, neutralization of B.1.351 was approximately two-thirds lower than that of USA-WA1/2020, an early SARS-CoV-2 isolate. [2]

Of considerable reassurance are the emerging data showing protection from severe infection and death for all vaccines in all settings, although the prevention of asymptomatic transmission and mild-to-moderate disease is more variable. The AstraZeneca ChAdOx1 vaccine showed only 10% protection against mild-to-moderate disease associated with the B.1.351 variant in a young population with median age of 30 in South Africa. By contrast, in the UK, ChAdOx1 demonstrated 75% protection against B.1.1.7 (including asymptomatic infection). The Novavax vaccine, which consists of purified spike protein, showed approximately 50% protection against infection in South Africa (largely the B.1.351 variant) and 86% protection against infection in the UK (predominantly the B.1.1.7 variant). Johnson & Johnson's human adenovirus-vectored vaccine showed 64% protection against moderate-to-severe disease in South Africa (dominated by the B.1.351 variant) and 66% protection against moderate-to-severe disease in the USA (mainly the Wuhan-1 variant with D614G), as assessed 29 days after vaccination. The Pfizer/BioNTech BNT162b2 mRNA vaccine was

reported to be less effective against B.1.351 than against non-B.1.351 variants based on a small analysis of breakthrough infections that were enriched for B.1.351 in Israel. The efficacy of CoronaVac/Sinovac inactivated virus vaccine in Brazil, where 75% of infections were with the P.1 variant, was estimated at around 50% against symptomatic infection.[5]

A study by Indian council for medical research(ICMR) which is yet to be peer reviewed found out that Covaxin(inactivated virus vaccine) creates 2.7 times less neutralising titre against the delta variant and three times less neutralising titre against the beta variant. The study demonstrated that despite a reduction in neutralisation titres with BBV152 (Covaxin) sera against B.1.351 (beta) and B.1.617.2 (delta), its neutralisation potential is well established.[6]

Unlike some viral infections (eg, Hepatitis B), protective level of antibodies SARS CoV-2 has not been determined yet. Fauci and colleagues noted that "Fortunately, neutralization titres induced by vaccination are high, and even with a 6-fold decrease, serum can still effectively neutralize the virus."[2]

COVID-19 vaccines elicit SARS-CoV-2-specific CD4+ and CD8+ T-cell responses as well as neutralizing antibodies. Even though antibodies elicited by current COVID-19 mRNA vaccines had shown diminished neutralizing activities against SARS-CoV-2 variants, T-cell responses may have a role for host protection against SARS-CoV-2 variants.In principle, it is more difficult to evade T-cell responses than a neutralizing antibody response because multiple T-cell epitopes are scattered across viral proteins, whereas neutralizing antibody targets a narrow region in the viral protein.Studies have shown that T-cell responses to the variants were not differ from those to the ancestral strain of SARS-CoV-2. Most SARS-CoV-2 T-cell epitopes were conserved despite the mutations in the variant.[3]

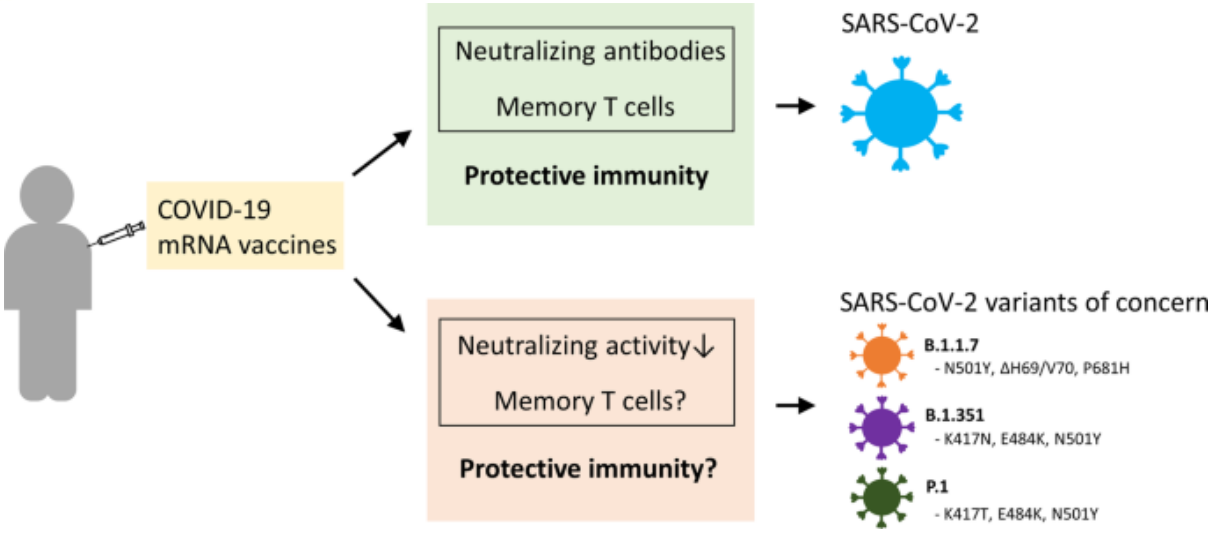


Fig2. Types of immune responses induced by COVID-19 vaccination.

One reason SARS-CoV-2 is throwing out variants and will continue to do so is because relatively few people globally have been vaccinated. The B.1.1.7 variant, first identified in the UK, is now the dominant SARS-CoV-2 variant in Israel as well as in the UK. COVID-19 cases and hospitalizations started to decline in mid-January in Israel, which leads the world in percentage of the population vaccinated. [2]

Transmission by infected asymptomatic vaccines could provide an opportunity for more virulent variants to spread. Even though nearly all vaccines used in humans prevent asymptomatic infection and spread, as of now even after fully vaccinated, people should continue to mask up and socially distance in public places. [2]

However there is no information about any vaccines against viral diseases other than seasonal flu that have had to be updated because of changes in the virus. Whether COVID-19 will join influenza as an infectious disease for which annual vaccination is required isn't yet known. Some of vaccine manufacturers have already begun preparing vaccines incorporating mutants. Modifying COVID-19 vaccines would probably be the most straightforward step in dealing with SARS-CoV-2 variants, but more challenging will be deciding which variant, when and how to deploy.[2]

CONCLUSION:

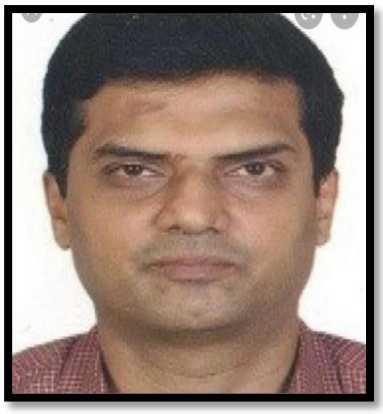
In spite of emergence of several variants, COVID-19 vaccines still appear to be a valuable tool in control of pandemic. Need further research about including variant strains in vaccines.

References:

1. https://www.who.int/news-room/feature-stories/detail/the-effects-of-virus-variants-on-covid-19-vaccines
2. Rita Rubin, MA. COVID-19 Vaccines vs. Variants—Determining How Much Immunity Is Enough. JAMA April 6, 2021 Volume 325, Number 13
3. https://www.cdc.gov/coronavirus/2019-ncov/variants/variant-info.html
4. Ji Yun Noh, Hye Won Jeong, Eui-Cheol Shin. SARS-CoV-2 mutations, vaccines, and immunity: implication of variants of concern. Signal Transduction and Targeted Therapy (2021) 6:203
5. Ravindra K. Gupta. Will SARS-CoV-2 variants of concern affect the promise of vaccines?Nature Reviews | Immunology June 2021 volume 21, 340-1
6. https://www.hindustantimes.com/india-news/icmrstudy-finds-covaxin-effective-against-covid-variants-101623178067041.html

DR SUDHINDRA RAO M
Head, Dept. of Medicine
KSHEMA Hospital
Derlakatte

Smoking Cessation- The Untold Harm



Smoking cessation is one of the hardest addictions to come clean primarily due to addictive effect of nicotine. There had been a spate of articles on negative aspect of smoking cessation like obesity which may discourage a potential quitter from smoke cessation. A counterview of this is article by Thomas et al concluding that the all-cause mortality is less in those who quit smoking in spite of substantial weight gain following smoking cessation. To provide more clarity on this on this vexed issue of harm versus benefit due to smoking cessation we need to look in-depth on both sides of the spectrum.

The idea that cigarette smoking is helpful in controlling body weight has been part of popular culture for many years. Cigarette advertisements from the early 1930s suggested that women should "reach for a cigarette instead of a sweet." An irony seldom shared with a potential quitter but an established medical fact is the effect smoking cessation has on weight gain. Individuals who successfully quit smoking generally gain 4 to13 kg within 8 years of quitting, whereas those who continue to smoke gain an average of 2-4 kg[1,2]. Most of this weight gain tends to occur within the first 6 months of abstinence [3]. Approximately 10% of smokers who quit smoking gain close to 13 kg in weight[4].

Apart from weight gain there are genuine concerns cited of higher prevalence of diabetes in smoker after cessation.Review report that the relative risk of developing type 2 diabetes compared with never smokers was 1.54 for those who quit in the past 5 years; 1.18 for those abstaining for 5–9 years, and 1.11 for long-term quitters (≥10 years) [5.] The increased risk may be due to increases in visceral fat accumulation, chronic inflammation, insulin resistance or excessive weight gain after quitting.

Effects of cigarette smoking on body weight are mediated by nicotine which reduces body weight by raising the resting metabolic rate and is a sympathomimetic agent that promotes local release of norepinephrine within body tissues and systemic release of epinephrine.

Nicotine increases thermogenesis in adipose tissue and also by modulates insulin sensitivity. Nicotine withdrawal also produces an elevated reward threshold. Therefore, greater amounts of highly rewarding foods rich in carbohydrates may be sought to achieve the pleasure previously derived from smoking.

Smoking cessation preludes to numerous health benefits some of which are evidenced within months but most of genuine health positives unfold over a period of time. These include reduced the risk of coronary heart disease and stroke while probability for lung cancer reduces to about half of that for a smoker.

Obesity an obvious cause of morbidity, preludes to many other significant ailments like diabetes, hypertension, sleep apnea, cardiovascular & neurological issues. However, obesity is not a direct cause of mortality and is likely to be due to associated co-morbidities. In this context all-cause mortality assessed in the study is a good surrogate indicator. This article provides teeth to the argument that smoking remains a significant cause for all-cause mortality. Also, the harmful effects of active smoking decisively offset any adverse effects seen in quitters like obesity.

References:

1. Lycett D, Munafò M, Johnstone E, Murphy M, Aveyard P. Associations between weight change over 8 years and baseline body mass index in a cohort of continuing and quitting smokers. Addiction. 2011; 106:188–196. [PubMed: 20925685]

2. O'Hara P, Connett JE, Lee WW, Nides M, Murray R, Wise R. Early and late weight gain following smoking cessation in the Lung Health Study. Am. J. Epidemiol. 1998; 148:821–830. [PubMed: 9801011]

3. Klesges RC, et al. How much weight gain occurs following smoking cessation? A comparison of weight gain using both continuous and point prevalence abstinence. J. Consult. Clin. Psychol. 1997; 65:286–291. [PubMed: 9086692]

4. Williamson DF, Madans J, Anda RF, Kleinman JC, Giovino GA, Byers T. Smoking cessation and severity of weight gain in a national cohort. N. Engl. J. Med. 1991; 324:739–745. [PubMed: 1997840]

5. Pan A, Wang Y, Talaei M, Hu FB, Wu T. Relation of active, passive, and quitting smoking with incident type 2 diabetes: a systematic review and meta-analysis. Lancet Diabetes Endocrinol. 2015; 3(12):958–67. Epub 2015/09/22. DOI: 10.1016/s2213-8587(15)00316-2 [PubMed: 26388413]

DR VISHAK ACHARYA K
Professor & Unit Head
Department of Pulmonary Medicine
KMC Hospitals, Mangalore.
E mail-vishak.acharya@manipal.edu

Life is gift of Divine. Guaranty can be given only by Him

Guaranty is a very common word, every one whether one knows the English language or not.In this commercial world everyone will ask about guaranty about a product or commodity. Is human life is a product of that type?

It was a memorable patient and occasion in my medical practice of 42 years. I was working as a physician in a small village hospital in Trichur district of Kerala surrounded by coconut trees and paddy fields. One day at about 7PM a young well-built person of about 25 years was brought to the hospital by a crowd of about 20-30 persons. He was living just next compound of the hospital. His father was running a small canteen in front of the hospital, the only source of eatable near the hospital. He was visiting the hospital at least two to three times a day.Patient was just hitting his one leg to the bed and not uttering a word except "Haa Haa Haa". History narrated by the crowd was that he came from the fields and fell on to some stones and after that he is in this state.Examination revealed few injury marks in the leg and some bleeding. He was not answering any questions. I was clueless about his problem, because leg injury is will not explain why he is not talking. I was more worried than the relatives because there was a huge crowd to whom I have to give answer. Just at that moment in front of my eyes he vomits blood. OH, I thought he must be having GI bleed and leg injury is due to fall.I came out and tried to explain to the huge crowd about the situation. The very next moment one chorus from the huge crowd including his father was, "Can you give us a guaranty on his life". I emphatically told them that NO. I can start stabilising him and can give blood and supportive treatment and observe. If necessary he can be sent for further management later. They were very clear

that if I give guaranty then only they will stay back otherwise they will go some other hospital. As I refused to use the word GUARANTY they took the patient away. I was also relived of stress of treating a patient with hostile bystanders. I returned to quarters which were just inside the hospital compound.

Within few minutes ward boy came running to my house to tell me that the same patient was brought back. We rushed to the emergency. Whole crowd was telling us it was a snake bite. They were about 5 km away from the hospital, then the patient opened his eyes and questioned them about where are they taking him.They told him that they are taking him to Ernakulum which is about 50 km away. Then he told them that it was a snake bite, and let us go back. The hospital I was working was very well known in Trissur and part of Ernakulum district. So they came back.I re-examined the patient and he was stable except bleeding at the site, mild swelling and GI bleeding. I informed his father and the large crowd, that we can treat him and we have enough stock of anti-snake venom. He should be OK. But his father and the crowd were not satisfied with my words. They were insisting that I should give them guaranty. Somehow I refused to use the word guaranty. I only told them that, we have adequate quantity of ASV and I can treat him. They were not satisfied and decided to take the patient to some other hospital. Nearest hospital were ASV was available was about 30 km away. Again I returned home with a sigh of relief of treating a patient, were the relative do not trust me.

Next day we came to know that he is in a hospital very famous for ophthalmology about 30km away and his condition is critical. Two days later he died in that hospital. To reach that hospital they have to cross two railway crossings and 30 km on the road. There the duty doctor attended him and later physician was called. So there was a delay of few hours which is very critical period. The physician there was also not very much experienced in treating poisonous snake bite.

I never used the word guaranty in my medical practice of 42 years. This probably saved me from hostile patient relatives after patient's death and medical malpractice law suits. What made me to refuse to use the word guaranty in my medical practice?

When I was a post graduate student at Kasturba Medical College at Manipal during 1977, we had a patient admitted in hospital for some ordinary viral fever. One day he suddenly developed symptomatic complete heart block. Only the cardiac investigation facility was

ECG, chest x-ray and SGOT. Cardiac catheterization was available but no coronary angiography. ECHO was not available. Our cardiologist put him on temporary pacing. Complete heart block did not resolve, so he needed permanent pacing. It took nearly one month to get it. And patients were very much upset under the circumstances mainly that they have come for simple fever and now it took a different turn and lot expenses also, for which they were not prepared. Of course it is natural for any one. But my professor Dr P Vittal Rao was very much cool and showed no sign of stress or apprehension in spite of all the problems. Under the above circumstance he taught me the lesson of medical practice that a doctor should never use the word guaranty to any patient under any circumstances. Not only to any sick and critical patients even to any person coming to visit a doctor for any medical opinion. If one takes the present medical scenario even the so called health check-up. I followed his advice in letter and spirit till the end of my medical practice.

Life is given by the Divine and only person who can give guaranty is DIVINE.

DR K.SUNDARA BHAT
Former Head & Professor of Medicine
FMMC, Mangaluru
Mobile: 9845099492
Email: drksbhat@gmail.com

OBITUARY - LATE DR H. A. BALLAL

.

Dr. H.A. Ballal, popularly known as Ha Ballal. Born on 31-8-1936. Retired from KMC August 1996. Died on 14-4-2021 at the ripe age of 85.

I met him for the first in August 1973 when I joined as a post graduate in MD Gen. Med. In Dr. KR. Shetty's unit. After the initial apprehension we became quite close and good friends thereafter.

He used to call me affectionately as RAMESHA. He was a well-knownfigure in Wenlock hospital initially as a civil Asst. Surgeon and later as a staff in the dept. of medicine KMC, Mangalore from where he retired at the age of 60 yrs. He was non corrupt, honest, gentleman to the core and was liked by his colleagues peers, post graduates and under graduates.

From the time I had known him he followed the principles of hand washing, maintaining social distancing much before Covid-19 infection was thought of. This strict discipline is probably responsible for being a bachelor for life. He was a very good clinician and had lot of compassion for poor people. Later he joined Yenepoya Medical College as Professor of Medicine and continued to work there till the fag end of life.

He was fond of good food. Wehad a good time with him along with late Prof. Amarnath Hegde, Professor HS Ballal, Late Dr. Bharath Moodbidri, Prof. Naveen Shetty , Late Dr. Sudhakar Shetty when we used to go to Mohini Vilas for mid-morning snack from Wenlock hospital.

He hardly ever footed the bill. One day we planned in such a way that I pretended to borrow Rs. 250/- from him and paid the bill. He was extremely annoyed with me for a long time later he realized it was done in good faith and fun.

He was regular in attending all API meetings and always came with Dr. Venkatraya Prabhu, Present dean of KMC, Mangalore.

I will always remember him as meticulously dressed man flaunting bright colored broad neck ties with a stethoscope dangling around his neck. Even in death he was magnanimous donating all his valuables and assets for the poor patients of KMC, attavar. I pray for his departed soul.

OM SHANTHI

(Receiving distinguished alumni award in Jan 1989 KMC Manipal)

(Felicitation by API DK chapter in his room on doctor‘s day)

DR RAMESH PAI
Emeritus Professor and Ex Dean
AIMS, Mangalore

Excerpts from Bumpy Roads: Glimpses in the meadows of Memory of a physician

Maternity posting in Medical school

During our medical training, the most exciting assignment used to be the "Maternity posting" month at Lalla Ded Hospital in Srinagar. A group of 16 students used to stay for 24x7 hours in the hospital for the whole month. As I recall, no sooner were we allotted the few rooms in the vicinity of the labour room, than we dropped our bags and headed towards the stage-1 labour room. The clinical round led by the Registrar on duty was in progress, and we joined her round. "Bring the Doppler to check the fetal heart of this patient's baby," said the house officer to one of the maternity students. The patient was tossing and turning with her labour pains and intermittently squeezing the hand of her nearby mother. She was prescribed medication to ease her pain and hasten the progress of her delivery. "We will give her a trial of medication, and if her labour doesn't progress well, or there is some emergency, she will be operated on," said the registrar on duty to her anxious mother. "Doctor, please do something to relieve me of this terrible pain!" the patient kept on begging, with tears in her eyes. "I will never ever get pregnant again," she added. From time to time we could hear her screaming with pain. Hours later she was transferred to the room for the 2nd stage of labour, and the midwife started to try to boost her morale, while the patient knitted her eyebrows in between her spasms of pains, and finally, in the dead of night, she delivered a baby. The cry of her newborn baby helped her to forget her pain – suddenly she was a mother! She could not keep her eyes off her newborn baby, even though they were falling closed with extreme tiredness after the delivery. In the meantime, the baby's birth was being celebrated by the family. The days went by, and

slowly we were all learning the art of delivery and its management. One day, having gone out to buy some groceries, we saw an ambulance arriving at the hospital compound. Its window panes were smeared with dust. The driver jumped down from his seat and pulled the back door of the ambulance open while extinguishing his cigarette with his left hand. We saw a pregnant woman lying on a stretcher, comatose, connected to an oxygen cylinder. She was accompanied by five or six anxious attendants and was hurriedly rushed to the emergency room of the hospital. After a quick examination in the emergency room, the house officer quickly shifted her to the eclampsia room. "Monitor her blood pressure, and also the fetal heart," ordered the consultant on duty. Two maternity students were allotted the job, and we made a chart. Her blood pressure was quite high, and she was bloated. The clinical diagnosis of Preeclampsia was reached, and the necessary treatment was started in the room, which was kept only partially illuminated, lest the dazzling light should trigger convulsions in the patient, a feared complication of the disease. Next day at sunset I found I could not detect the beating of the fetal heart with the Doppler. I immediately rushed off to find the nearby Intern on duty. She came immediately, and almost tripped on her heels on the way, but neither could she hear the fetal heartbeat in the patient's womb. "Amma (mother), I'm so sorry, but the fetal heart has stopped. It seems that the angel of death has kissed the baby in the womb. We need to take it out of the mother. I'm so sorry we could not save the child, but let us try to help the mother of the baby now," said the Registrar on duty to the patient's mother. The tears started falling down the cheeks of the mother of the patient as she gave consent for labour to be induced in her unconscious daughter. A dead baby was delivered hours later. The patient's condition started improving, and gradually she regained consciousness. We were all happy that she had come out of her coma but sad about the death of her baby. The next morning the patient wanted to know when she had been hospitalised and where her baby was. Yes, the mother was in search of her child, and unfortunately, none of us in the team knew what to say – we were speechless. The consultant on call during the morning rounds glanced at her and affectionately touched her forehead. "Shift her to the ward in the afternoon," she said. "I am late for the operating theatre; the list is long, and I need to go," the consultant said, and she asked the registrar to continue the rest of the round.

On another occasion during this posting, Mr Iqbal Fatekhan our batchmate was singing in his melodious voice a very famous Kashmiri song in the restroom—"Gachhi nai saaf dil, detie laaf saasa ....." (unless your heart gets cleaned whatever you boast of, it is all meaningless .Intentions matter in life). Another friend had brought a big tape recorder of around 2 feet long which must have been 7-8kgs in weight, and the session was being recorded. While this was going on, someone knocked on the door. We all stopped singing, and some students slipped under their blankets. A few even pretended to be snoring. One of the students opened the door, and yes, the intern on duty was standing there. "I need two of you to accompany a patient to the operating theatre as I need to have a discussion with the anaesthetist on call. One of the ladies has to undergo an emergency caesarean section due to fetal distress," she explained and then left, closing the door behind her with a bang. At around 2 a.m. the patient was operated upon, and her newborn was sent for observation to the pediatric intensive care department in the adjacent Children's Hospital. I was asked to monitor the mother's vitals in the recovery room. "Doc, please tell me where my baby is," she mumbled while I was tying a blood pressure cuff on her arm to measure her blood pressure. "Your baby is in the pediatric hospital next door for observation. Otherwise, she's fine," said I. "Oh no Doc – another girl child! How will I go home with a third daughter in a row?" and she burst into tears, her voice breaking, and a stream of tears starting from her eyes. "But it is not your fault at all," I tried to explain to her: "You have no control over the gender of any of your children. In fact, it is the Y chromosome of the father, your husband that determines whether the newborn is male, and not you." I tried my best to explain this to her, but without success. Unfortunately, dear Reader, human history has witnessed many gross injustices done to females through the ages. In the olden days in the Arab world when girls were born, they would be silenced soon after their first cry, till the Prophet Muhammad, peace be upon him, put an end to this menace. On the Indian subcontinent, until Raja Ram Mohan Roy and others put an end to it, the unfortunate custom known as "Sati" which demanded that women cast themselves onto their husband's funeral pyre, persisted for centuries. Nowadays so-called educated and advanced man has gone still farther, and has been choking female foetuses while still in the womb, "the female foeticide". It must have affected millions of girl babies so far and has naturally created serious

gender imbalances in many parts of the world. The contribution of women to the world has been and is still enormous, and was wonderfully summed up by William Ross Wallace in his poem 'What Rules the World?' when he wrote that the hand that rocks the cradle is the hand that rules the world. It illustrates the influence a mother has on her child and, in the long run, on society itself. From this, we understand that by yielding to her natural maternal instinct to nurture and teach her child, a woman explicitly makes the world a much better place. This puts a great responsibility on the medical fraternity to stop female foeticide, which is nothing short of murder. An antipathy against female children in any society would soon disappear when women are enabled to become strong citizens at par with men. This is possible only by means of education for girls, in every sense of the word. They should be taught self-defence as well, so that the devil's evil eye remains at bay. A step further towards this goal will be made when society simplifies its customs and offers equal opportunities to all. Only then will this unfortunate male imposed gender inferiority of women disappear from our planet. Destruction of this wonderful creation of the Almighty would soon become a thing of the past.

Coming back to our maternity posting, the days continued to flow, one into another and the same group of students lived together for virtually the entire month. We would often study together and discuss the process of labour. It was a perfect example of that beautiful model now called "team-based learning" in modern medical education. We would eat together, crack many jokes and in general also had a lot of fun. All of us enjoyed the posting and the month flew by. We left that hospital having learnt many things. An assignment like this shows how much trust patients, better call them saints, bestow on a budding doctor. I remember this period with great affection, and to this day we all honour this great hospital and its grand name, "Lalle Ded " after the great mystic poet of ancient Kashmir. It has served many patients tirelessly for many decades now. Dear reader, while the maternity posting offers a beautiful opportunity for a young doctor to hone his or her medical skills, it also makes one think about, and understand, love for mother. A mother sacrifices herself for her children right from conception and through the 9 months of gestation, and then finally she faces the terrible pain of labour. Witnessing this should remind us how much we owe to our mothers. It should make us stop to think also of womanhood in general, and

"Bumpy Roads", a book which is essentially a travelogue, but also a travelogue through life itself, containing what I hope are universal messages for all readers.
-Dr.Ibrahim Masoodi

DR.IBRAHIM MASOODI
MD.DM.(Gastro) FACP FACG,FASGE
Consultant Gastroenterologist, Associate Professor
Yenepoya Medical College, Mangalore,
Mobile +917483069637

In particular the unfortunate social structures which still exist today. After this posting, we joined our classes again.

CALL FOR ARTICLES

Readers are hereby requested to submit their articles for the next issue.
Submit to : editorapidk2020@gmail.com
Author instructions@page 89

BASICS OF PET-CT IMAGING

'PET-CT' scan stands for *"Positron Emission Tomography-Computed Tomography"*. It is a revolutionary hybrid imaging technology that combines two imaging modalities i.e. 'PET scan' and 'CT scan' into a single investigation. While a 'PET scan' provides critical information regarding the metabolic or functional status of the disease whether it is 'Metabolically Active' or 'Metabolically Inactive'; 'CT scan' provides vital information regarding the size, shape and location. Thus, a combined 'PET-CT scanner' became a powerful hybrid imaging technology.

PET-CT scan is also often referred to as *'One-Stop Shop'* for diagnosing diseases, especially in oncology.

History of PET-CT scanners in India:

In October 2002, the then Prime Minister of India, late Shri Atal Behari Vajpayeeji inaugurated the country's first dedicated PET scanner at RMC, Mumbai (Radiation Medicine Centre in Tata Memorial Hospital premises). However, this was a standalone PET scanner with no CT scan. With time, it was realized that the vital information provided by CT scan was also needed to provide holistic details of the disease. India's first 'PET-CT' scanner was commissioned in the Department of Nuclear Medicine & Molecular Imaging of Tata Memorial Hospital, Mumbai in December 2004. This provided the vital trigger for revolution of molecular imaging (PET) in our country. The impact of PET-CT can be assessed from the exponential increase in the number of PET-CT scanners in our country, from a mere handful of scanners in 2005 to nearly 350 scanners in 2021.

What is a Positron?

A Positron is basically a 'positively charged electron'. Positron has an electric charge of '+1' and has the same mass as that of electron. It is emitted by positron emitting radionuclides like 18-Fluorine, 68-Gallium, 11-Carbon, 13-Nitrogen etc.

Once positron is emitted, it combines with a neighboring electron in an annihilation reaction to produce pair of 511 keV gamma rays in opposite directions which is detected by the scanner.

Radiopharmaceuticals used in PET Imaging:

Radiopharmaceuticals basically consist of a 'Biologically active compound' that is given in non-pharmacological doses, which is tagged with a 'Positron emitting radionuclide' which is used to track the flow and distribution of the 'Biologically active compound' within the body. For example in 18F-FDG; 'FDG' is the 'biologically active molecule' which is tagged with '18-Fluorine', a positron emitting radionuclide.

18F- FDG (18Fluorine-Fluorodeoxyglucose): It is the most commonly used PET radiopharmaceutical. It is basically a glucose analog that is transported across the cell membrane similar to glucose by transporters such as GLUT-1. FDG is phosphorylated by hexokinase similar to glucose and then metabolically trapped in the cell. FDG is not able to metabolize further in the glycolytic pathway like glucose and gets 'Metabolically Trapped'. In highly metabolic tumors with a high requirement for glucose, an FDG concentration far greater than normal background is usually achieved.

The other radiopharmaceuticals used in PET Imaging are:

-*Gallium-68 PSMA* for Prostate Cancer

-*Gallium-68DOTANOC* for Neuroendocrine Tumors

- *'PET Bone Scan'* using *18-Sodium Fluoride* which is superior to the conventional 'Technetium-MDP Bone Scan'. Whereas, conventional 'MDP Bone scan' detect only osteoblastic or sclerotic bone metastases, 'PET Bone Scan' can detect lytic, sclerotic &marrow, all three types of bone metastases.

Indications for PET-CT scan:

Nearly 80-85 % of the indications for PET-CT are in Oncology. While nearly 15-20 % indications are Non-Oncological.

Indications in Oncology:

- Staging of Cancer
- Evaluation of 'Primary Site' in 'Malignancy of Unknown Origin (MUO)'
- Metabolic Biopsy: To guide biopsy site from 'Metabolically Active' areas for more accurate results and minimize 'Inconclusive Results'.
- Evaluation of 'Indeterminate Lesion' For Example: 'Solitary Pulmonary Nodule (SPN)'.
- To guide 'Radiation Therapy Planning': RT Planning with PET-CT results in highly focused radiation to target tissues with sparring of surrounding normal tissues.
- Assessing response to Treatment Post chemotherapy and Radiotherapy: 'PET scan' helps in early identification of 'responder' or 'non-responder'. Thus the chemotherapy regimen can be modified or continued accordingly and the decision can be made very early.
- Restaging of Cancer in suspected recurrence or relapse.
- Follow-Up of treated patients.
- To differentiate between radiation induced necrosis versus tumor recurrence (For Example: In Primary CNS Malignancy post Radiation Therapy).

Non-Oncological Indications:

- *Cardiology:*

1) To assess Myocardial Viability: The assessment of myocardial viability is important in the management of patients with coronary artery disease and left ventricular dysfunction. The goal of viability imaging is to determine the likelihood of recovery of systolic function after revascularization procedures like PTCA and CABG. Currently FDG-PET is considered the 'gold standard' in Myocardial Viability assessment.

2) To evaluate Inflammatory Cardiomyopathy: Useful in evaluation of Inflammatory Cardiomyopathy like Cardiac Sarcoidosis, Myocarditis, Vasculitis etc., whose diagnosis is quite challenging in clinical practice. In cardiac sarcoidosis, PET is useful for evaluation of extra-cardiac disease as well in the same sitting. It is also useful in monitoring response to treatment.

- *Neurology:*

1) Movement Disorders: Dopamine is the key neurotransmitter in the nigro-striatal-pallidal-thalamo-cortical circuit. 18F-Fluorodopa (F-Dopa) is one of the most commonly used radiopharmaceuticals for studying the dopaminergic system in movement disorders. It is

useful as an adjunct to clinical diagnosis for differentiating various types of Parkinsonian syndromes.

2) Epilepsy: Complex partial seizures in a significant proportion of patients remain uncontrolled despite optimal medical therapy. Surgical removal of epileptogenic foci in partial seizures such as intractable temporal lobe epilepsy results in significant improvement in control of the seizures and the quality of life. Modern MRI is able to identify the source of the seizure in the majority of patients with partial seizures. However, 20–30% of potential surgical candidates with focal epilepsy have normal MRI. The main clinical uses of PET in epilepsy are localization of such epileptogenic foci in potential surgical candidates with partial seizures.

3) Brain Tumors: Diagnosis and prognostication of various primary CNS malignancies can be done using traditional FDG PET. 18F-FET (18F-Fluoro-Ethlytyrosine) PET scan and 11C-Methionine PET are also used for molecular imaging of different types of gliomas.

4) Dementia & Alzheimer's disease: FDG PET has been used extensively to study. Dementia and it is an effective tool for early diagnosis and differentiation of various types of Dementia. Alzheimer's disease (AD) patients exhibit characteristic temporoparietal glucose hypometabolism. With progression of disease, there may also be frontal lobe involvement. The degree of hypometabolism correlates with the severity of dementia.Amyloid imaging agent: 11Carbon-labeled Pittsburgh Compound-B (11C-PiB), which is used to image the hallmark pathological features of Alzheimer's disease (AD) – fibrillar amyloid-β (Aβ) plaques – holds great promise.

- *Fever of Unknown Origin (FUO):* FDG PET is useful in evaluation of patients with FUO. Various etiologies which cause FUO such as Lymphoma, other malignancies, tuberculosis, sarcoidosis, Infective Endocarditis, Vasculitis, Thyroiditis, chronic osteomyelitis, atypical pneumonias, inflammatory bowel disease, infected vascular graftsand prostheses are frequently identified on PET.

-*Orthopedic Indications:* FDG PET is useful in evaluation of various primary bone malignancies. In osteoid osteoma, FDG pet is useful in assessing response to procedures such as RFA. It is also useful in the evaluation of non-oncologicmusculoskeletal disorders, such as osteomyelitis, arthritis, and complications oforthopedic implants such as loosening versus

peri-prosthetic infection. 68Ga-citrate and 68Ga-Transferrin have been recently introduced for imaging of inflammation and infection in the musculoskeletal system.

- *Autoimmune Diseases:*FDG PET is useful to evaluate the new group of diseases called IgG4 diseases.FDG PET/CT isn't included in standard sarcoidosis workup, but it's efficient in the initial diagnosis and follow ups of disease management. It can help to assess cardiac involvement, response to treatment, and evaluation of reversible granulomas as well as to determine the best site for biopsy. 18F-FDG-PET can differentiate normal thyroid parenchyma from diffuse inflammatory changes of the thyroid gland in patients with autoimmune thyroid diseases (AITD). FDG uptake in rheumatoid arthritis in affected joints reflects disease activity with the correlation between FDG and clinical parameters, monitoring the response to therapy also. FDG-PET/CT shows a high diagnostic value for polymyalgia rheumatica in differential diagnosis from rheumatoid arthritis.

Preparations for FDG PET-CT scan:

- 4-6 hours of fasting. Plain drinking water is permitted.
- Fasting Glucose levels should be less than 200 mg/dl.
- There should be gap of minimum 4-6 hours after last anti-diabetic medication.
- In hospitalized patients: No dextrose containing IV Fluids should be given atleast 4-6 hours prior.
- Recent Serum Creatinine and RBS values should be available.
- It is contraindicated in pregnancy.
- Lactating mothers have to abstain from breast feeding for atleast 6 hours after the scan.

PET-CT scan Procedure:

18F-FDG is injected according to body weight of patient and as per the PET scanner specifications. Modern PET scanners with higher sensitivity require lesser doses. After injection, there is waiting period of 45 min-1 hour for distribution of radiotracer within the body and uptake in the diseased organ/tissue. During this period, patient will be made to sit in separate isolation cubicle. Following which, the patient is taken on the PET-CT scanner. The scan time is approximately 30 minutes. So, the usual time to complete the procedure is approximately 2-3 hours.

SUV (Standardized Uptake Value) in PET:

SUV is a semi-quantitative estimate of the tumor aggressiveness. It is basically a ratio of tissue radioactivity concentration (e.g. in kBq/ml) at a given time, divided by the administered dose at the time of injection (e.g. in MBq) divided by body weight (e.g. in kg).

SUV is very useful for response assessment to see change in disease burden and evaluate effectivity/failure of therapy.

Summary:

PET scan is already an established imaging modality in oncology and FDG continues to be the most widely used radiopharmaceutical in clinical use. However, new specific radiopharmaceuticals have been developed (like Ga-68 PSMA for Prostate Cancer Imaging and Ga-68 DOTANOC for Neuroendocrine tumors) and many other radiopharmaceuticals are in research phase for specific types of cancers or disease processes.

Apart from oncology, PET scan has a lot of potential in various other fields of medicine too, like neurology, cardiology, orthopedics, infectious diseases and immunology.

With each passing day, the role of PET will continue to expand with more indications getting approved and newer radiopharmaceuticals being developed at a staggering pace.

DR. SUJITH RAI
Consultant PET-CT & Nuclear Medicine,
A.J. Hospital & Research Centre, Mangalore.

Case report: Subacute Thyroiditis following COVID-19

Case

47-year-old woman presented to the OPD with history of fever especially in the evenings, pain/ discomfort in the region of left ear and neck since the last one week. She also gives a history of weight loss of approximately 4-5 kg in the last 2-3 weeks. She was evaluated for fever extensively and no cause could be found. She had finished 2 course of antibiotic without any improvement.

Table 1: Initial investigations

Investigation	**Result**
Hb	10.3 gm%
TC	9,800/c mm
DC	N-61%, L-36%, E-3%
Platelet count	2,24,000/l
Peripheral smear	Microcytic, hypochromic RBC
ESR	84 mm/hour
CRP	16 mg/l (0-4)
MPFT	Negative
Dengue NS1	Negative
Leptospira	Negative
Sputum for AFB	Negative
Urine analysis	Normal
Chest X ray	Normal
USG abdomen	Normal

One month back, she had suffered from high grade fever, sore throat and headache. She was found to be positive for Covid-19 (RT-PCR +ve). She was subjected to home quarantine and recovered without any major issues with only symptomatic treatment.

On examination, right lobe of thyroid was palpable and tender. Rest of the systemic examination was within normal limits.

Table 2: Further investigations

Investigation	**Result**
T3	289 ng/dl (60-180)
T4	17.6 µg/dl (5.5-12)
TSH	0.01 µIU/ml (0.3-5)
USG thyroid	Diffusely increased vascularity suggestive of thyroiditis
FNAC	Presence of giant cells suggesting "DeQuervain's thyroiditis"

Since the pain was severe and there was evening rise of temperature, she was given a short course of low dose steroids, with which she was symptomatically better in few days. Steroid dose was tapered over 3 weeks. Her thyroid function became normal after 6 weeks.

Discussion

Subacute thyroiditis is also known as granulomatous,giant cell, and de Quervain's thyroiditis. It is not as uncommon as previously thought.It is seen more often seen in women and is typicallycharacterized by a painful tender thyroid gland,with pain radiating to the ear, as well as systemic symptoms(fevers, malaise, and anorexia)[1].

Subacute thyroiditis is a self-limiting illness with 3 distinct phases: an initialthyrotoxic phase, followed by hypothyroidism, andthen recovery of thyroid function over weeks to months. It is usually preceded by an episode of viral illness. The diagnosis is mainly clinical based on pain and tenderness over thyroid which typically radiates to ear/jaw. There will be biochemical picture of toxicosis (Elevated T3 & T4 with suppressed TSH) associated with elevated inflammatory markers like ESR/CRP. USG neck will demonstrate elevated vascularity (seen in all forms of thyroiditis as well as Graves' disease). Technetium pertechnate scan will show reduced uptake in the thyroid region. FNAC will show typical giant cells, though it is not needed in every case. Since there is already severe pain in the thyroid region, FNAC becomes a little difficult at times.

Anti-inflammatory drugs like NSAIDs will be sufficient in many, but steroids will be required in patients with severe symptoms. Tapering dose of steroids (Prednisolone equivalents of 15 mg tapered to 5 mg) over 3-4 weeks will give symptomatic relief. Since there is no increase in synthesis of thyroxine in subacute thyroiditis (only excessive release of the preformed hormones into the circulation because of inflammation), anti-thyroid drugs like Carbimazole do not have any role and should not be prescribed. If used anti thyroid drugs will induce hypothyroidism.

Patients may go into transient hypothyroidism (TSH up to 20) as part of natural course of thyroiditis. Majority (>70%) will become euthyroid in few months' time.

The exact mechanisms by which SARS-CoV-2 causesthyroid dysfunction are not known. When literature was reviewed, these were the possible mechanisms:

1. Inflammatory response, apoptosis, and local damage:
   Apoptotic cells have been found in liver and thyroid tissue of SARS-CoV patients[2].
2. Direct viral replication in the thyroid
3. Interactions with ACE2 receptor:Angiotensin-convertingenzyme 2 (ACE2) receptors are expressed inmultiple organs other than the lungs, including the thyroid.

Conclusion

Clinicians must be aware of the possibility of thyroiddysfunction and subacute thyroiditis after COVID-19 infectiondue to SARS-CoV-2. Early recognition and timelyanti-inflammatory therapy can avoid unnecessary investigations and can help in successful managementof the disease.

Practice pearls

1. Subacute thyroiditis can occur 3-6 weeks after COVID-19 infection
2. Pain over neck radiating to jaw/ear and tenderness over thyroid with evening rise of temperature are classical clinical features
3. Biochemical picture of thyrotoxicosis (High T3,T4 and low TSH) with elevated ESR
4. FNAC is confirmatory (Giant cells), but not needed in all
5. Anti-inflammatory therapy (steroids/NSAID) will relieve symptoms
6. Anti-thyroid drugs are not indicated
7. Majority become euthyroid in few months

Bibliography

1. Khatri A et al, Eur Thyroid J 2020;9:324–328.
1. Chau TN et al, Hepatology. 2004; 39(2):302–10.

DR GANESH H.K.

Consultant Endocrionologist

AJIMS, Mangalore

CALL FOR ARTICLES

Readers are hereby requested to submit their articles for the next issue.

Submit to : editorapidk2020@gmail.com

Author instructions@page 89

Practice matters- ABC of death certificates

Death is a common phenomenon..!!

Death may occur in-hospital or outside the hospital (home / old age home/ Jail/ any other place of residence or work etc)

Death may be

1) Natural (Disease process at any age or Senility);

2) Unnatural (external causes: intentional - Suicide / Homicide or unintentional- accident)

As per the prevailing Rule & Act, all deaths have to be reported to local Registrar of Births & Deaths and compiled with state and national registry of Births & Deaths, before the specified day of every month. (1,2)

It is the right and duty of every Doctor, under professional capacity to declare death in all cases of death. (3)

It is also mandatory to issue the certificate of death & cause of death vide rule 7 of Karnataka Registration of Births & Deaths Rules, 1999 (No. PDS 208 SMC 99), by the treating doctor. However, Doctor is not bound to declare the cause of death unless he/ she has attended the last illness of the deceased as per (3) of rule 10 (2)

Doctor should not issue a death certificate for any unnatural death / suspicious death (Suicide / Homicide / accident/ punishment) and it is the obligatory duty of the Doctor to inform such an unnatural or suspicious death to the Police for the needful procedure. In such conditions, the certificate of cause of death is issued only after the inquest and post mortem reports.

Deaths occurring in the hospital should be confirmed (declaring death) by the treating doctor and the cause / causes leading to death - *not the process of dying* – should be documented in the specified form- 4, immediately after death.

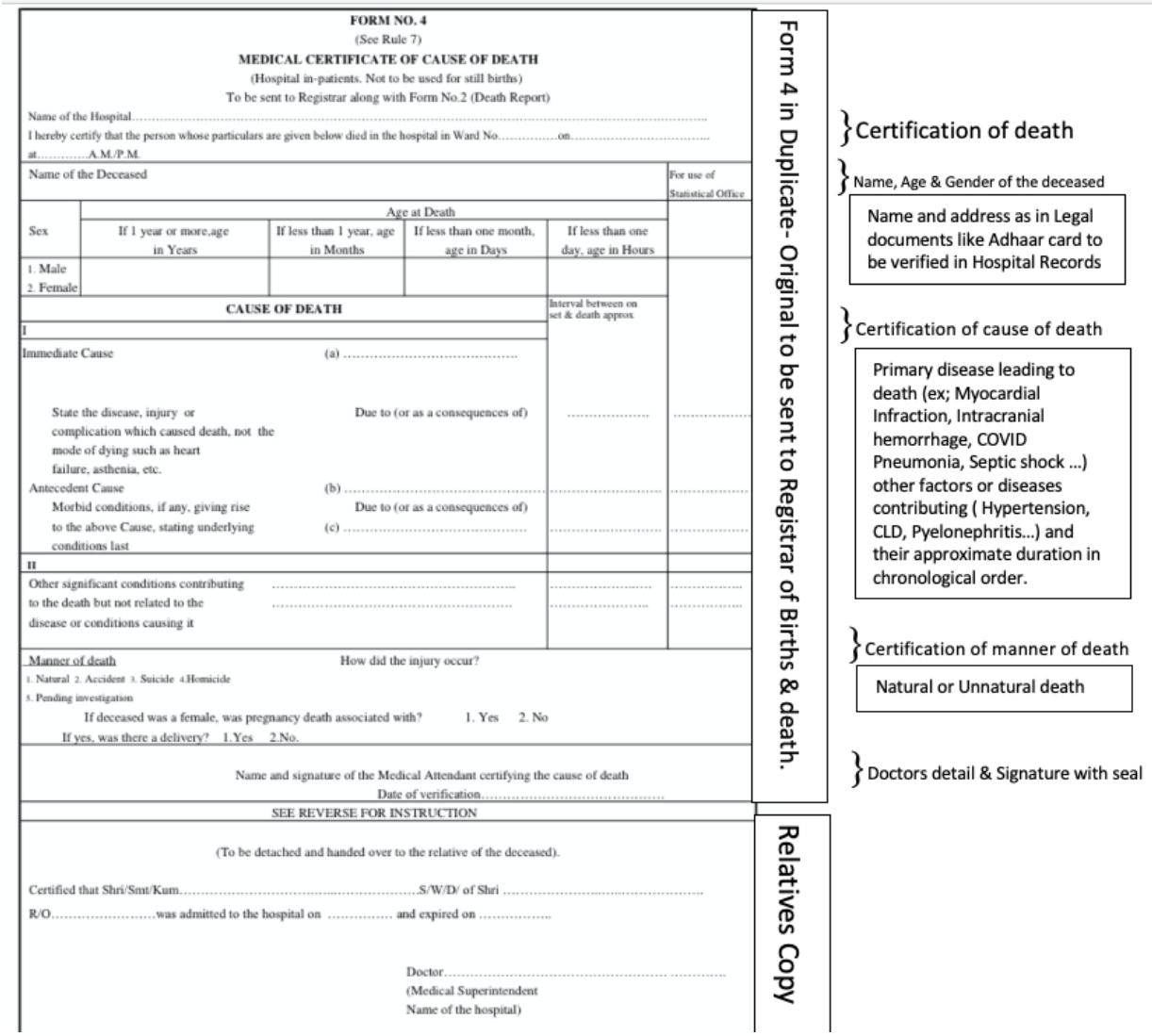
The lower part of the form 4 is to be issued to the close relative of the deceased, as the document of death in the hospital, for the purpose of transportation and for the appropriate disposal of the body.

The same copy is also needed to obtain the death certificate from the local registrar of Births & Deaths in stipulated time.

The original, completely filled up and duly signed form 4 is to be sent to the Registrar of Births & Deaths along with intimation of death in form-2, from the hospital within 7 days.

Duplicate carbon copy of such form 4 is retained with the hospital MRD.

Filling up the form 4



FORM NO. 4

(See Rule 7)

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(Hospital in-patients. Not to be used for still births)

To be sent to Registrar along with Form No.2 (Death Report)

Name of the Hospital.....

I hereby certify that the person whose particulars are given below died in the hospital in Ward No.....on.....

at.....A.M./P.M.

Name of the Deceased					For use of Statistical Office
Sex	Age at Death: If 1 year or more, age in Years	If less than 1 year, age in Months	If less than one month, age in Days	If less than one day, age in Hours	
1. Male 2. Female					

CAUSE OF DEATH

		Interval between onset & death approx.	
I			
Immediate Cause	(a)		
State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc.	Due to (or as a consequences of)	.....	.....
Antecedent Cause	(b)	.....	.....
Morbid conditions, if any, giving rise to the above Cause, stating underlying conditions last	Due to (or as a consequences of) (c)	.....	.....
II			
Other significant conditions contributing to the death but not related to the disease or conditions causing it	.....	.....	.....

Manner of death — How did the injury occur?

1. Natural 2. Accident 3. Suicide 4.Homicide 5. Pending investigation

If deceased was a female, was pregnancy death associated with? 1. Yes 2. No

If yes, was there a delivery? 1.Yes 2.No.

Name and signature of the Medical Attendant certifying the cause of death

Date of verification.....

SEE REVERSE FOR INSTRUCTION

(To be detached and handed over to the relative of the deceased).

Certified that Shri/Smt/Kum.....S/W/D/ of Shri .....

R/O.....was admitted to the hospital on ..... and expired on .....

Doctor.....

(Medical Superintendent

Name of the hospital)

Form 4 in Duplicate- Original to be sent to Registrar of Births & death.

Relatives Copy

} Certification of death

} Name, Age & Gender of the deceased

Name and address as in Legal documents like Adhaar card to be verified in Hospital Records

} Certification of cause of death

Primary disease leading to death (ex; Myocardial Infraction, Intracranial hemorrhage, COVID Pneumonia, Septic shock ...) other factors or diseases contributing (Hypertension, CLD, Pyelonephritis...) and their approximate duration in chronological order.

} Certification of manner of death

Natural or Unnatural death

} Doctors detail & Signature with seal

Many often, patient is brought dead to the hospital / Doctor

Deaths occurring outside the hospital, should be confirmed by the treating doctor and the cause / causes leading to death- *not the process of dying* – should be recorded in the specified form 4A (*not Form 4*) (1,2)

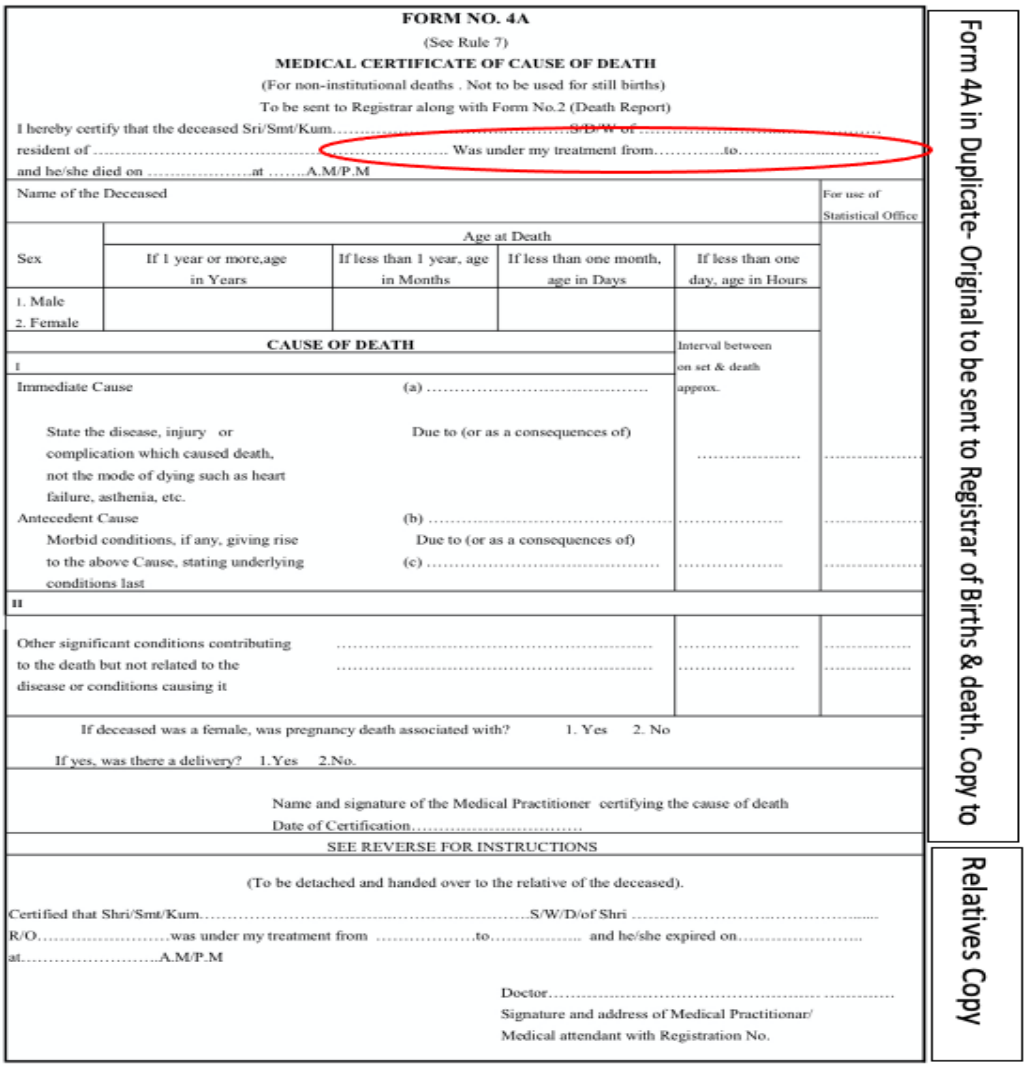
Situations of Brought dead:

a) to the hospital / Doctor, where deceased was receiving treatment during his last illness (and has record) : Doctor / Hospital previously treated, is legally bound to certify the death and issue death certificate(cause of) in form 4A, and send it along with
b) intimation of death in form-2, to the local authority registering the births & death within 7 days. (1,2)
c) to the hospital / Doctor, where deceased was NOT receiving treatment during his last illness (has records of illness from other hospital) : i) Doctor / Hospital is legally bound to certify the death, ii) and may issue the death certificate(cause of) in form 4A based on the available reports, but no obligations to issue the cause of death in such case. iii) However, previous treating hospital or Doctor may issue the death certificate (cause of) in form 4A.
d) to the hospital / Doctor, where there is no medical records of previous illness: Doctor / Hospital is legally bound to certify the death. However, the death certificate (cause of) in form 4A, need not be issued.

However, if there is any suspicion on nature of death other than natural, especially death of young female, female child etc, Doctor / hospital is legally bound to send intimation to the Police for further needful procedures (1).

Filling up the form 4A is similar to form 4, but there are two differences,

i) Doctor certifying death has to declare that deceased was under his treatment and
ii) there are no columns to fill the manner of death



FORM NO. 4A

(See Rule 7)

MEDICAL CERTIFICATE OF CAUSE OF DEATH

(For non-institutional deaths . Not to be used for still births)

To be sent to Registrar along with Form No.2 (Death Report)

I hereby certify that the deceased Sri/Smt/Kum.....S/D/W of .....

resident of ..... Was under my treatment from.....to.....

and he/she died on .....at .....A.M/P.M

Name of the Deceased					For use of Statistical Office
Sex	Age at Death: If 1 year or more, age in Years	If less than 1 year, age in Months	If less than one month, age in Days	If less than one day, age in Hours	
1. Male 2. Female					

CAUSE OF DEATH

I		Interval between on set & death approx.	
Immediate Cause	(a)		
State the disease, injury or complication which caused death, not the mode of dying such as heart failure, asthenia, etc.	Due to (or as a consequences of)	.....	.....
Antecedent Cause	(b)	.....	.....
Morbid conditions, if any, giving rise to the above Cause, stating underlying conditions last	Due to (or as a consequences of) (c)	.....	.....
II			
Other significant conditions contributing to the death but not related to the disease or conditions causing it	....	....	....

If deceased was a female, was pregnancy death associated with? 1. Yes 2. No

If yes, was there a delivery? 1.Yes 2.No.

Name and signature of the Medical Practitioner certifying the cause of death

Date of Certification.....

SEE REVERSE FOR INSTRUCTIONS

(To be detached and handed over to the relative of the deceased).

Certified that Shri/Smt/Kum.....S/W/D/of Shri .....

R/O.....was under my treatment from .....to..... and he/she expired on.....

at.....A.M/P.M

Doctor.....

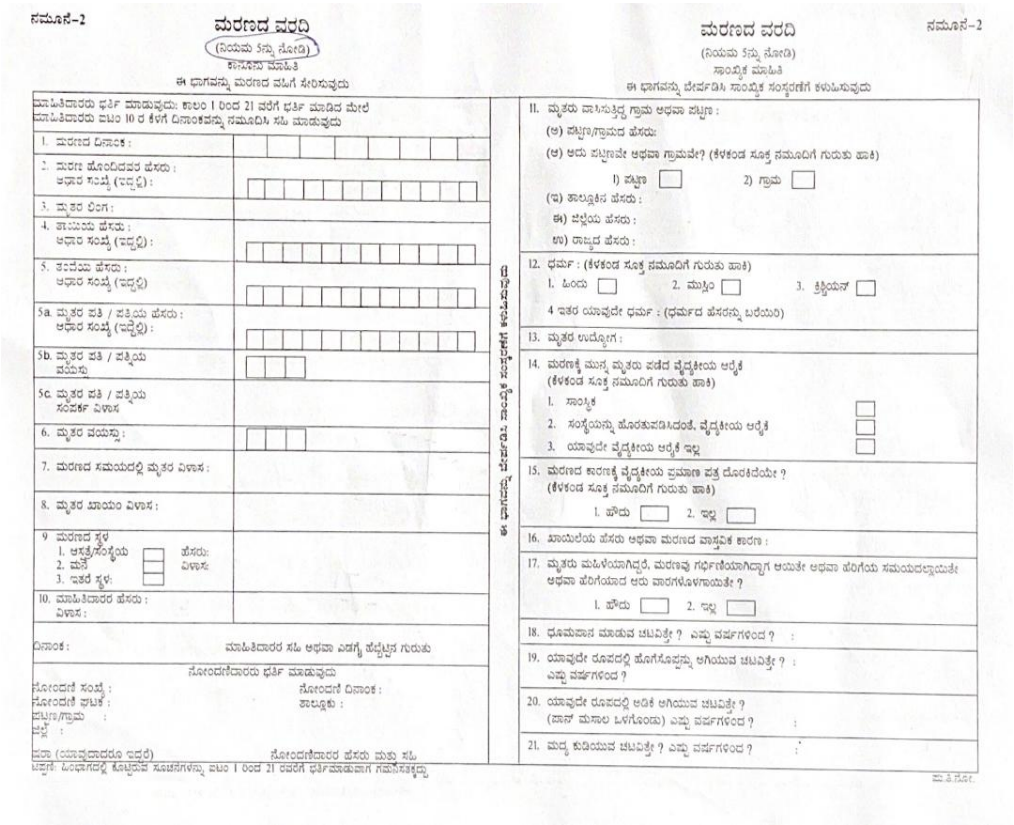
Signature and address of Medical Practitionar/

Medical attendant with Registration No.

Form 4A in Duplicate- Original to be sent to Registrar of Births & death. Copy to Relatives Copy

Intimation of death:

All in-hospital deaths should be informed to the local authority of registration of birth & death (at office of Village accountant / Nagara or town Panchayat / Municipal Corporation) within 7 days of death in form 2 along with form 4 or 4A. (2)



ನಮೂನೆ-2

ಮರಣದ ವರದಿ

(ನಿಯಮ 5ನ್ನು ನೋಡಿ)

ಕಾಯಿದೆಯ ಮಾಹಿತಿ

ಈ ಭಾಗವನ್ನು ಮರಣದ ವಹಿಗೆ ಸೇರಿಸುವುದು

ಮಾಹಿತಿದಾರರು ಭರ್ತಿ ಮಾಡುವುದು: ಕಾಲಂ 1 ರಿಂದ 21 ವರೆಗೆ ಭರ್ತಿ ಮಾಡಿದ ಮೇಲೆ ಮಾಹಿತಿದಾರರು ಪಟಿಂ 10 ರ ಕೆಳಗೆ ದಿನಾಂಕವನ್ನು ನಮೂದಿಸಿ ಸಹಿ ಮಾಡುವುದು

1. ಮರಣದ ದಿನಾಂಕ :
2. ಮರಣ ಹೊಂದಿದವರ ಹೆಸರು : ಆಧಾರ್ ಸಂಖ್ಯೆ (ಐಚ್ಛಿಕ) :
3. ಮೃತರ ಲಿಂಗ :
4. ತಾಯಿಯ ಹೆಸರು : ಆಧಾರ ಸಂಖ್ಯೆ (ಐಚ್ಛಿಕ) :
5. ತಂದೆಯ ಹೆಸರು : ಆಧಾರ ಸಂಖ್ಯೆ (ಐಚ್ಛಿಕ)
5a. ಮೃತರ ಪತಿ / ಪತ್ನಿಯ ಹೆಸರು : ಆಧಾರ ಸಂಖ್ಯೆ (ಐಚ್ಛಿಕ) :
5b. ಮೃತರ ಪತಿ / ಪತ್ನಿಯ ವಯಸ್ಸು
5c. ಮೃತರ ಪತಿ / ಪತ್ನಿಯ ಸಂಪರ್ಕ ವಿಳಾಸ
6. ಮೃತರ ವಯಸ್ಸು :
7. ಮರಣದ ಸಮಯದಲ್ಲಿ ಮೃತರ ವಿಳಾಸ :
8. ಮೃತರ ಖಾಯಂ ವಿಳಾಸ :
9. ಮರಣದ ಸ್ಥಳ
   1. ಆಸ್ಪತ್ರೆ/ಸಂಸ್ಥೆಯ ಹೆಸರು:
   2. ಮನೆ ವಿಳಾಸ:
   3. ಇತರ ಸ್ಥಳ:
10. ಮಾಹಿತಿದಾರರ ಹೆಸರು : ವಿಳಾಸ :

ದಿನಾಂಕ : ಮಾಹಿತಿದಾರರ ಸಹಿ ಅಥವಾ ಎಡಗೈ ಹೆಬ್ಬೆಟ್ಟಿನ ಗುರುತು

ನೋಂದಣಿದಾರರು ಭರ್ತಿ ಮಾಡುವುದು

ನೋಂದಣಿ ಸಂಖ್ಯೆ : ನೋಂದಣಿ ದಿನಾಂಕ :
ನೋಂದಣಿ ವಾಚಕ : ತಾಲ್ಲೂಕು :
ಪಟ್ಟಣ/ಗ್ರಾಮ :
ಜಿಲ್ಲೆ :

ಮೇಲಾ (ಯಾವುದಾದರೂ ಇದ್ದರೆ) ನೋಂದಣಿದಾರರ ಹೆಸರು ಮತ್ತು ಸಹಿ

ಟಿಪ್ಪಣಿ: ಹೆಚ್ಚಾಗಲ್ಲಿ ಕೊಟ್ಟಿರುವ ಸೂಚನೆಗಳನ್ನು ಪಟಿಂ 1 ರಿಂದ 21 ವರೆಗೆ ಭರ್ತಿಮಾಡಿದಾಗ ಗಮನಿಸಿಕೊಳ್ಳಬೇಕು

ಈ ಭಾಗವನ್ನು ಸಾಂಖ್ಯಿಕ ಸಂಸ್ಥೆಗಳಿಗೆ ಕಳುಹಿಸಿಕೊಡುವುದು

ಮರಣದ ವರದಿ

(ನಿಯಮ 5ನ್ನು ನೋಡಿ)

ಸಾಂಖ್ಯಿಕ ಮಾಹಿತಿ

ಈ ಭಾಗವನ್ನು ಬೇರ್ಪಡಿಸಿ ಸಾಂಖ್ಯಿಕ ಸಂಸ್ಥೆಗಳಿಗೆ ಕಳುಹಿಸುವುದು

ನಮೂನೆ-2

11. ಮೃತರು ವಾಸಿಸುತ್ತಿದ್ದ ಗ್ರಾಮ ಅಥವಾ ಪಟ್ಟಣ :
    (ಅ) ಪಟ್ಟಣ/ಗ್ರಾಮದ ಹೆಸರು:
    (ಆ) ಅದು ಪಟ್ಟಣವೇ ಅಥವಾ ಗ್ರಾಮವೇ? (ಕೆಳಕಂಡ ಸೂಕ್ತ ನಮೂದಿಗೆ ಗುರುತು ಹಾಕಿ)
    1) ಪಟ್ಟಣ ☐ 2) ಗ್ರಾಮ ☐
    (ಇ) ತಾಲ್ಲೂಕಿನ ಹೆಸರು :
    ಈ) ಜಿಲ್ಲೆಯ ಹೆಸರು :
    ಉ) ರಾಜ್ಯದ ಹೆಸರು :
12. ಧರ್ಮ : (ಕೆಳಕಂಡ ಸೂಕ್ತ ನಮೂದಿಗೆ ಗುರುತು ಹಾಕಿ)
    1. ಹಿಂದು ☐ 2. ಮುಸ್ಲಿಂ ☐ 3. ಕ್ರಿಶ್ಚಿಯನ್ ☐
    4 ಇತರ ಯಾವುದೇ ಧರ್ಮ : (ಧರ್ಮದ ಹೆಸರನ್ನು ಬರೆಯಿರಿ)
13. ಮೃತರ ಉದ್ಯೋಗ :
14. ಮರಣಕ್ಕೆ ಮುನ್ನ ಮೃತರು ಪಡೆದ ವೈದ್ಯಕೀಯ ಆರೈಕೆ (ಕೆಳಕಂಡ ಸೂಕ್ತ ನಮೂದಿಗೆ ಗುರುತು ಹಾಕಿ)
    1. ಸಾಂಖ್ಯಿಕ ☐
    2. ಸಂಸ್ಥೆಯನ್ನು ಹೊರತುಪಡಿಸಿದಂತೆ, ವೈದ್ಯಕೀಯ ಆರೈಕೆ ☐
    3. ಯಾವುದೇ ವೈದ್ಯಕೀಯ ಆರೈಕೆ ಇಲ್ಲ ☐
15. ಮರಣದ ಕಾರಣಕ್ಕೆ ವೈದ್ಯಕೀಯ ಪ್ರಮಾಣ ಪತ್ರ ದೊರಕಿದೆಯೇ ? (ಕೆಳಕಂಡ ಸೂಕ್ತ ನಮೂದಿಗೆ ಗುರುತು ಹಾಕಿ)
    1. ಹೌದು ☐ 2. ಇಲ್ಲ ☐
16. ಖಾಯಿಲೆಯ ಹೆಸರು ಅಥವಾ ಮರಣದ ವಾಸ್ತವಿಕ ಕಾರಣ :
17. ಮೃತರು ಮಹಿಳೆಯಾಗಿದ್ದರೆ, ಮರಣವು ಗರ್ಭಾಣಿಯಾಗಿದ್ದಾಗ ಆಯಿತೇ ಅಥವಾ ಹೆರಿಗೆಯ ಸಮಯದಲ್ಲಾಯಿತೇ ಅಥವಾ ಹೆರಿಗೆಯಾದ ಆರು ವಾರಗಳೊಳಗಾಯಿತೇ ?
    1. ಹೌದು ☐ 2. ಇಲ್ಲ ☐
18. ಧೂಮಪಾನ ಮಾಡುವ ಚಟವಿತ್ತೇ ? ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ? :
19. ಯಾವುದೇ ರೂಪದಲ್ಲಿ ಹೊಗೆಸೊಪ್ಪನ್ನು ಅಗಿಯುವ ಚಟವಿತ್ತೇ ? : ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ?
20. ಯಾವುದೇ ರೂಪದಲ್ಲಿ ಅಡಿಕೆ ಅಗಿಯುವ ಚಟವಿತ್ತೇ ? (ಜಾನ್ ಮಸಾಲ ಒಳಗೊಂಡು) ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ? :
21. ಮದ್ಯ ಕುಡಿಯುವ ಚಟವಿತ್ತೇ ? ಎಷ್ಟು ವರ್ಷಗಳಿಂದ ? :

ಮಾ.ನಿ.ಸೇ.

Domiciliary death can be reported to the concerned registering authority by the head of the family in prescribed form 2.

Certificate on cause of death from a doctor is not mandatory as per 2) of rule 8 of Karnataka Registration of Births & Deaths Rules, 1999 (No. PDS 208 SMC 99).

In whatever the case, the death certificate is to be issued only ONCE, Free of cost to the nearest relative of the deceased (1, 3).

It is mandatory to issue treatment certificate /discharge / death summary, in case of all hospital deaths, along with part of form 4. (3 of 3)

APPENDIX-3

FORMAT FOR MEDICAL RECORD
(see regulation 3.1)

Name of the patient :

Age :

Sex :

Address :

Occupation :

Date of 1st visit :

Clinical note (summary) of the case :

Prov. : Diagnosis :

Investigations advised with reports :

Diagnosis after investigation :

Advice :

Follow up :

Date: Observations:

Signature in full .

Name of Treating Physician

The final, legal death certificate (Form- 6) is issued by the registrar of births & deaths. (2)

ನಂ.
No.

ನಮೂನೆ– 6
Form – 6

Government of India

ಕರ್ನಾಟಕ ಸರ್ಕಾರ

GOVERNMENT OF KARNATAKA

ಜನನ ಮತ್ತು ಮರಣಗಳ ಮುಖ್ಯ ರಿಜಿಸ್ಟ್ರಾರರು

Chief Registrar of Births and Deaths

ಮರಣ ಪ್ರಮಾಣ ಪತ್ರ

(ಜ.ಮ.ನೋ. ಅಧಿನಿಯಮ,1969ರ 12/17ನೆಯ ಪ್ರಕರಣ ಹಾಗೂ ಕ.ಜ.ಮ.ನೋ ನಿಯಮಗಳು,
1999ರ ನಿಯಮ 8/13ರ ಮೇರೆಗೆ ಕೊಡಲಾದ)

DEATH CERTIFICATE

(Issued under Section 12/17 of the RBD Act, 1969 and Rule 8/13 of the KRBD Rules, 1999)

ಈ ಕೆಳಕಂಡ ವಿವರಣೆಯನ್ನು ಕರ್ನಾಟಕ ರಾಜ್ಯದ _____ಜಿಲ್ಲೆಯ _____ ತಾಲ್ಲೂಕಿನ _____(ಗ್ರಾಮ/ಪಟ್ಟಣ)ದ ರಿಜಿಸ್ಟರಿನಲ್ಲಿರುವ ಮರಣ ಸಂಬಂಧವಾದ ಮೂಲ ದಾಖಲೆಯಿಂದ ತೆಗೆದುಕೊಳ್ಳಲಾಗಿದೆಯೆಂದು ಪ್ರಮಾಣೀಕರಿಸಲಾಗಿದೆ.

This is to certify that the following information has been taken from the original record of death which is the register for …….. (village/town) of ……taluk of ……..district of Karnataka State.

(1) ಹೆಸರು
Name ……..

(2) ಲಿಂಗ
Sex ……..

(3) ಮರಣದ ದಿನಾಂಕ
Date of Death ……

(4) ಮರಣದ ಸ್ಥಳ
Place of Death …….....

(5) ತಾಯಿಯ ಹೆಸರು
Name of Mother ……

(6) ತಂದೆಯ/ಗಂಡನ ಹೆಸರು
Name of the Father/Husband……

(7) ಮರಣದ ಸಮಯದಲ್ಲಿ ಮೃತರ ವಿಳಾಸ
Address of the deceased at the time of death:
……..
……..
……..

(8) ಮೃತರ ಖಾಯಂ ವಿಳಾಸ
Permanent address of the deceased
……..
……..
……..

(9) ನೋಂದಣಿ ಸಂಖ್ಯೆ
Registration No ……..

(10) ನೋಂದಣಿ ದಿನಾಂಕ:
Date of Registration ……

(11) ಷರಾ (ಯಾವುದಾದರೂ ಇದ್ದಲ್ಲಿ)
Remarks(if any) ……..

(12) ಪ್ರಮಾಣಪತ್ರ ನೀಡಿದ ದಿನಾಂಕ:
Date of issue ……..

(13) ಪ್ರಮಾಣ ಪತ್ರ ಕೊಡುವ ಪ್ರಾಧಿಕಾರಿಯ ಸಹಿ
Signature of the issuing authority
……..

(14) ಪ್ರಮಾಣ ಪತ್ರ ಕೊಡುವ ಪ್ರಾಧಿಕಾರಿಯ ವಿಳಾಸ
Address of the issuing authority
……..

ಮೊಹರು/ **Seal**

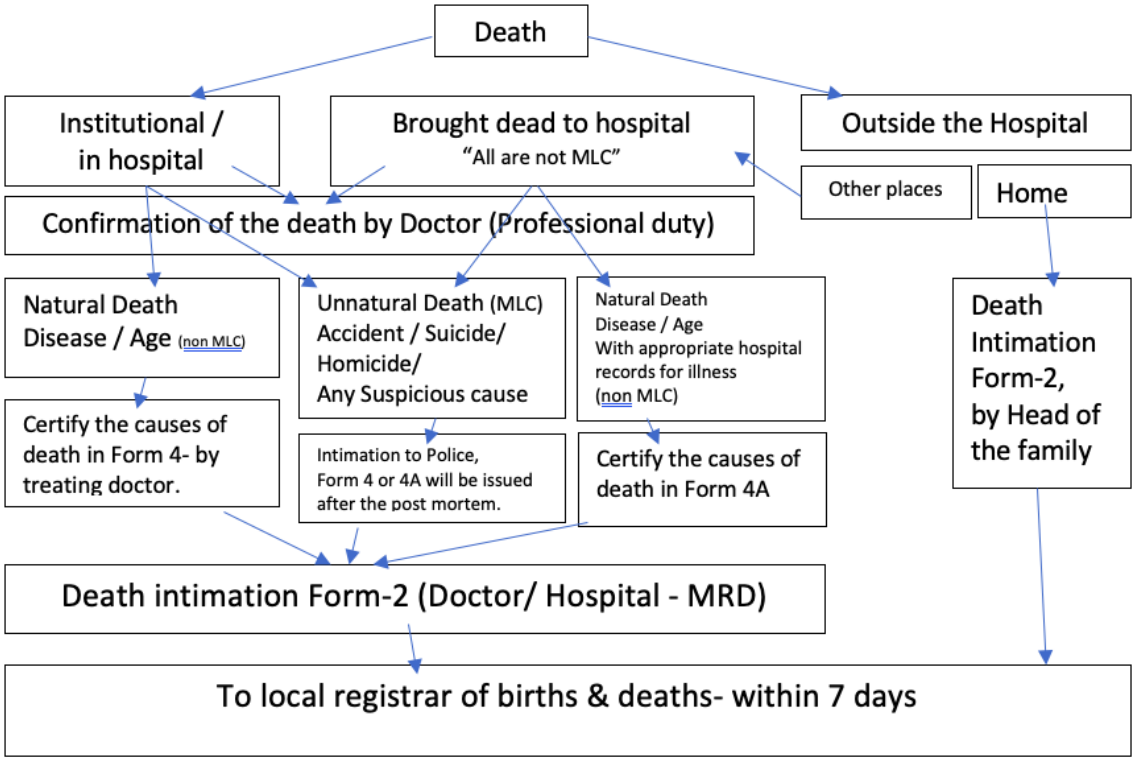
"ಪ್ರತಿಯೊಂದು ಜನನ ಮತ್ತು ಮರಣದ ನೋಂದಣಿಯನ್ನು ಖಚಿತಪಡಿಸಿಕೊಳ್ಳಿ"
"Ensure registration of every birth and death"

ವಹಿಯಲ್ಲಿ ನಮೂದಾದ ರೀತಿಯಲ್ಲಿ ಮರಣದ ಕಾರಣಗಳ ಬಗ್ಗೆ ಬಹಿರಂಗಗೊಳಿಸುವಂತಿಲ್ಲ. ಪ್ರಕರಣ 17(1)ರ ಪರಂತುಕ ನೋಡಿ.
No disclosure shall be made of particulars regarding the cause of death as entered in the Register. See proviso to Section 17(1).

Summary:

- Death certificate is an important legal document, issued by the registrar of births & deaths.
- It is the professional duty of every Doctor, to declare death, in all cases of death. However, certifying the cause of death is the legal responsibility of treating doctor. Such certification by the Doctor is only for intimation & statistical purpose and not a legal death certificate for utilization in transactions ofproperties,bank/ insurance, fund etc.!
- Every death has to be informed by the hospital or treating Doctor in case of institutional death / head of the family in case of domiciliary death, within 7 days, to the local registrar of births & deaths, for the purpose of the appropriate entry of such deaths and cause of the death, in the register, within 21 days of deaths.
- Every doctor should be familiar with Form-2, Form-4 & Form-4A, pertaining to intimation of death and cause of death.

Flowchart of procedure to be followed:



References:

1) Registration of Births and Deaths Act,1969 (Act no 18 of 1969)
2) Karnataka Registration of Births & Deaths Rules, 1999 (No. PDS 208 SMC 99)
3) Indian Medical Council (Professional conduct, Etiquette and Ethics) Regulation 2002, (published in Part III, Section 4 of the Gazette of India, dated 6th April 2002, and amended up to 25 March 2020.

DR C RAMACHANDRA BHAT
Professor and Head
Dept of General Medicine,
KVG Medical College, Sullia.
9448328511
crbhat1@rediff.com

RESIDENTS CORNER: AT THE GRASSROOTS

They say that medicine is learnt from patients more than books, but the Covid pandemic turned the tables in a jiffy. For the final year of MBBS, we had to confine our knowledge to online classes and PDFs, with no hands-on experience for many months. After the lockdown, we got around two months of clinical sessions, during which we tried to cram whatever we could, into our brains. For me, it was all a blur. I just know that I somehow cleared my final year exams and I was grateful that internship was finally starting!

It was all fun and games till we were posted for Covid duty. To be honest, I dreaded it even before it started. I was posted for three days of monitoring of home-isolated Covid patients and I was not very confident of how I would face this situation. My parents were very concerned because of the risk of exposure to the virus, but this was what I was called to do, it was in my job description. So, I just brushed away my fears and decided to take up the challenge. On retrospect, I feel like this experience did teach me a lot.

What awed me the most was the dedication of the ASHA workers, PHC health workers and all the other people who work at the fundamental level. We had to report to the assigned PHC and from there, the ASHA workers would accompany us to the Covid patients' houses which were situated far and wide. The weather too was not always on our side, with sudden heavy showers which created potholes (literally!) in our way. After visiting the houses allotted for the day, we had to show our reports to the Medical Officer in the PHC, and she/he would take note of patients who required hospital admission and then personally contact them and do the needful. I was really impressed by the intricacies of this operation and how crucial it was to ensure that the patients received all the necessary care at their homes itself.

These measures may look insignificant at the outset but they have shown to go a long way in decreasing the patient load in the hospitals.

I also learnt that the major part of the burden of the healthcare department fell on those who work at the lower rungs of the hierarchy. This was further proven when I was posted in a PHC. The amount of work, ranging from collecting and transporting swabs to tracing contacts and submitting daily reports and so on, can be quite overwhelming! Their work is under constant scrutiny by higher officials if the daily targets are not met. I remember that they used to leave the PHC at around 9 am and go to the villages to collect samples and return only at around 2 pm. Then they had to update the information about the samples collected and transport the swabs to the district hospitals. They hardly managed to squeeze in a lunch during that gap. Some days it was pretty hectic as they had higher sample targets to meet. To top it off, the layman doesn't exactly cooperate fully. He doesn't realise that all of this is done so that he can get treated conveniently. He feels like he's being victimised and

doesn't agree to get tested or doesn't reveal his primary and secondary contacts. This adds to the difficulty of the healthcare workers as they have to go the extra mile and go to each house nearby and convince the people to get tested.

The medical fraternity has outdone itself during this pandemic and shown how even with limited resources and a huge population like ours, we have handled the pandemic to the best of our abilities. It's easy for the privileged to sit on their comfortable couches and vocalise their disappointment at how the Covid situation is worsening, and after some time, conveniently forget about it, whereas the healthcare workers are tirelessly working towards achieving the goal of increasing testing, monitoring home-isolated patients and ensure that the best of care is delivered to their doorstep. It's truly remarkable as to how they carry out their duties with so much enthusiasm. I was so tired with just three days of Covid duty and here, I see these people, take each day as it comes with the same energy as the previous day and do their work whole-heartedly. These are the unsung heroes of our nation who play an essential role in winning this battle against the pandemic!

NESSA DSILVA
Intern,
FMMC, Mangalore

JOURNAL SCAN

Section Editors
Dr Chakrapani M
Dr B.Sadananda Naik

Summaries of important published articles

1. Co-administration of rabies vaccine with covid vaccine

https://timesofindia.indiatimes.com/city/bengaluru/covid-anti-rabies-vax-can-be-taken-on-the-same-day/articleshow/83359094.cms

The Association for Prevention and Control of Rabies in India (APCRI), based in Bengaluru has issued an advisory of rabies prophylaxis during COVID-19 pandemic. It states that post-stray animal bite cases, anti-rabies vaccines and rabies immunoglobulins/ rabies monoclonal antibodies (Post Exposure Prophylaxis) must be administered, even if the person has received any dose of COVID-19 vaccine.

They can even both be given on the same day at different sites, as they are both essential and life-saving

"If the person is exposed to the animal after the first dose of the COVID vaccine, the second dose of the same vaccine should be scheduled at a minimum gap of two weeks after completing the last dose of rabies vaccine," an excerpt of the guidelines stated.

2. What we know about covid-19 reinfection so far

BMJ 2021; 372 doi: https://doi.org/10.1136/bmj.n99 (Published 19 January 2021)

A COVID-19 infection does provide a degree of immunity to reinfection. But, there are credible reports of patients getting the infection for a second time. The author emphasizes on continuing social distancing and wearing the masks to avoid reinfection and aiding its spread

.

3. Mucormycosis in COVID-19: A systematic review of cases reported worldwide and in India

Awadhesh Kumar Singh et al Diabetes & Metabolic Syndrome: Clinical Research & Reviews https://doi.org/10.1016/j.dsx.2021.05.019.

There are increasing case reports of rhino-orbital mucormycosis globally but more so in India. In this systematic review of literature by the Indian authors shows that diabetes and use of corticosteroids in the background of COVID-19 seems to be the reason. Optimization of blood glucose with cautious use of corticosteroids appears to be key to prevention.

JOURNAL PUBLICATIONS OF OUR MEMBERS FOR THE QUARTER

Dr Vishak Acharya et al

1. Acharya KV, Unnikrishnan B, Rathi P, Shreenivasa A. COVID-19 pandemic: need of the hour – a course correction, restructuring &review of our policies – an Indian perspective. J Epidemiol Glob Health 2020 [In Press]

Dr B.Sadananda Naik

2. Naik BS. Hypnale coagulopathy: snake envenomation of a different kind. J R Coll Physicians Edinb. 2021 Mar;51(1):31-36. doi: 10.4997/JRCPE.2021.108.

Dr Vishnu Sharma et al

3. Vishnu sharma.M. How to improvise postgraduate training in respiratory medicine in India. IJTB 68 (2021) 303-306. https://doi.org/10.1016/j.ijtb.2021.03.009
4. Vishnu sharma.M; Localised hyper translucency in AECOPD. Pulmon Vol23, Issue1, Jan– Apr 2021; 46 -47
5. Moleyar, V.s., Noojibail, A., I, N.s. et al. Role of CT scan thorax in nCovid19—a case-based review. Egypt J Radiol Nucl Med 52, 148 (2021). https://doi.org/10.1186/s43055-021-00528-8
6. Sharma VM, Walikar BA. Recurrent hemoptysis in a patient with bronchial asthma. J Adv Lung Health 2021; 1:70-4.
7. Sharma VM, Sohail Mohammed MB. Chronic cough with fever. J Adv Lung Health 2021; 1:75-6.

8. Bhattacharjee NV, Schaeffer LE,A Boloor, Hay SI; Local Burden of Disease Exclusive Breastfeeding Collaborators. Mapping inequalities in exclusive breastfeeding in low- and middle-income countries, 2000-2018. Nat Hum Behav. 2021 Jun 3. doi: 10.1038/s41562-021-01108-6. Epub ahead of print. PMID: 34083753.
9. Vander Heide, J.D., Yang, M.,A Boloor ,Hay, S.I Local Burden of Disease HIV Collaborators. Subnational mapping of HIV incidence and mortality among individuals aged 15-49 years in sub-Saharan Africa, 2000-18: a modelling study. Lancet HIV. 2021 Jun;8(6):e363-e375. doi: 10.1016/S2352-3018(21)00051-5. PMID: 34087097; PMCID: PMC8187986.
10. Cork, M.A., Henry, N.J., Watson, S., A Boloor , Hay, S.I., Dwyer-Lindgren, L. Local Burden of Disease HIV Collaborators. Mapping subnational HIV mortality in six Latin American countries with incomplete vital registration systems. BMC Med 19, 4 (2021). https://doi.org/10.1186/s12916-020-01876-4

Acharya KV, Unnikrishnan B, Rathi P, Shreenivasa A. COVID-19 pandemic: need of the hour – a course correction, restructuring &review of our policies – an Indian perspective. J Epidemiol Glob Health 2020 [In Press]

Short summary by the author

COVID-19 Pandemic: Need of the Hour- A Course Correction, Restructuring & Review of Policies

Glaring shortfalls and inconsistencies in strategies to combat the pandemic have surfaced worldwide irrespective of the country's economic and health care status. The responses have vacillated from mute to drastic. Gaps in health preparedness coupled with administrative tardiness, lack of co-ordination and foresight has heightened the impact of pandemic. Coordinated holistic approach with structured policies in place is the need of the hour. Surveillance and epidemiological models to predict the unpredictable and preempt the backlash will dictate our future successes and failures in this protracted fight against the pandemic.

Problem areas and loopholes:

- Lack of scientific credibility, administrative justification and evidence based on effectiveness of various lockdown strategies.
- Subjectivity and arbitrariness in impositions of lockdowns, travel restrictions and quarantine measures
- Absence of a vigilant and structured surveillance cell
- Little coordination between medical arm, administrative, political and bureaucratic set-up.
- Lack of a definite medium to long term plan in place based on projection models
- Escalation, de-escalations and emergency measures in event of various contingencies poorly defined.
- Inconsistencies in emergency situational responses.
- Health programme and infrastructural preparedness from a long term perspective yet to be envisioned.
- Delivery of the models in terms of outcome assessment not reviewed judiciously.
- Political wisdom overriding medical and scientific opinions.

- Parallel arms in health, administration and bureaucracy creating multiple control with jurisdictional overlaps and power centers leading to conflicts in programme implementation.

Proposed recommendations:

- Creation of ***surveillance cells*** for effective containment by early identification of epidemic spurts locally; to prevent the spread to outside of the cluster zone. Such a surveillance cell, set up at a block or district level is closely monitored by state surveillance units under the directive of regional and national bodies. It should be headed by an *epidemiological unit* teethed with support from physicians, public health specialists, microbiological cells, health workers, local administrators, non-governmental organizations and health volunteers.
- A ***dedicated health force*** comprising of medical & paramedical workers to combat pandemic will give a cutting edge. To make provisions in our medical education system to create, train and increase the post-graduates qualifying in this nascent specialty. To bridge this acute gap, fellowship/ diploma programme for Physicians / Pulmonologist/ Anesthetist/ Pediatrician's may be considered too. Respiratory therapists, laboratory technicians, specialized nursing staff are vital cogs of the core team in high dependency units and intensive care units (ICU) that are critical to the outcome.
- ***Triaging of patients with stratification based on risk***, comorbidities and symptoms is the key in mortality reduction, reducing burden on health care & in optimizing hospital occupancy.
- Creation of credible, ***scientific and evidence based data*** on the ***effectiveness of various lockdown and travel restriction*** measures will be critical in imposition of these stringent but necessary measures in future. ***Statistical modelling on stringency of lockdowns & restrictions*** aided by inputs from epidemiological and microbiological surveillance cells should be developed to initiate, monitor, relaxation of lockdowns & travel restrictions
- Forming a ***central task force to coordinate*** between health, epidemiological and microbiological services to liaise with administrators and to guide the politicians.
- ***Post COVID care rehabilitation*** should be initiated taking into account the possible need for medical, psychological and socio-economic rehabilitation.

Hypnale coagulopathy: Snake envenomation of a different kind

Naik BS. Hypnale coagulopathy: snake envenomation of a different kind. J R Coll Physicians Edinb. 2021 Mar;51(1):31-36. doi: 10.4997/JRCPE.2021.108.

Short summary by the author

Hypnale hypnale is a small pit viper which is known as hump-nosed pit viper [HNV] or "Merrem's hump-nosed pit viper" and it is endemic to Sri Lanka, Western Ghats of South India. For long, it was thought that this viper bite would result in mild systemic or local envenomation, but now we do know that the HNV bites could cause severe systemic toxicity and mortality. The commonest systemic toxicity of this viper envenomation is the coagulopathy, which is well known as "Hypnale coagulopathy". This coagulopathy is quite different from the haemotoxicity caused by other vipers.

The polyvalent antivenom available in India, Sri Lanka and other South Asian countries is found to be ineffective against the hypnale envenomation and this is the main drawback in the management of hypnale coagulopathy. Use isotonic saline with or without fresh frozen plasma have been found to be effective in preventing complications.

In many patients' asymptomatic coagulopathy seen, in the form of non-coagulable blood for several days. The coagulopathy gets resolved gradually over a period of few days spontaneously without any intervention.

Review article: Role of CT scan thorax in nCovid19 and Post Covid pulmonary fibrosis

Abstract: CT scan of the chest is a useful investigation in nCovid19. CT scan is useful for early diagnosis of lung involvement, detect complications, triaging of cases, risk stratification and preoperative evaluation in select cases. CT scan should be done only when there is a definite indication so as to reduce radiation hazard and to reduce health care expenditure.

Introduction

nCovid19 disease starts as upper respiratory illness. Some of these patients develop viral pneumonia. Most of the morbidity and mortality in nCovid19 is due to pneumonia. Hence early diagnosis and treatment of pneumonia due to nCovid19 is essential to reduce morbidity and mortality. Clinicians should be aware about the indications for CT scan of thorax, timing of the investigation, and limitations of CT. Unnecessary CT scan will add on to healthcare cost and exposure to radiation.

Duration since the onset of first symptom of the disease in nCovid19 is very important. During the first five days usually the disease is confined to the upper respiratory tract. After the 5^{th} day usually lower respiratory involvement starts. Any time between 5 to 14 days' lower respiratory involvement can occur, though maximum chance is between 5 -12^{th} day. After 14 days' thromboembolic complications can occur up to 3 to 6 months. Derangement in total white cell count, neutrophil/lymphocyte ratio, C-reactive protein, Liver function tests, renal function tests, LDH, D-Dimer and Ferritin may give some clue regarding the risk of complications.

Most common complication and cause of death in nCovid19 is viral bronchopneumonia. Early diagnosis and treatment improves the outcome in these patients. Systemic steroid, anticoagulant, antiviral medications and correction of hypoxia are essential in all patients with bronchopneumonia. CT scan thorax is useful in detecting the lung lesions early in these patients.

Till recently high resolution CT scan was preferred. Recent studies showed that low-dose CT protocol is a reliable diagnostic tool to detect nCovid-19 pneumonia. Low-dose chest CT protocol results in a remarkable reduction (up to 89%) in the radiation dose compared to the standard-dose protocol without lowering diagnostic accuracy. High resolution CT is indicated only if any other diffuse parenchymal lung disease is suspected. Contrast CT is required if any other additional pathology requiring contrast is suspected. CT pulmonary angiogram is required if pulmonary embolism is suspected.

Indications for CT scan thorax in nCovid19

For diagnosis

1. Chest CT scan is indicated in patients with moderate to severe respiratory symptoms and pretest probability of nCovid19 infection, when RT-PCR test results are negative, and in any patient for whom an RT-PCR test is not performed or not readily available. CT may be useful in high risk cases for early diagnosis of nCovid19 pneumonia. In high risk cases without any respiratory symptoms, CT should be done after the 4^{th} day of onset of first symptoms as lung involvement usually occurs after 4^{th} day.
2. Chest CT scan has been suggested to have potential value as a rapid triaging tool in patients with moderate to severe respiratory symptoms in a resource-constrained environment where nCovid19 is highly prevalent.When rapid antigen test is negative and RT-PCR test report takes time, CT can be used in seriously ill patients to decide whether it is Covid or non Covid.
3. Patients who are dependent on oxygen even after two weeks, CT may help to show the extent of lung involvement and predict long-term prognosis.
4. CT may be done to exclude nCovid19 pneumonia. In patients with high risk for nCovid19 who require immediate diagnosis to rule out lung involvement CT may be done. A normal CT excludes nCovid19 pneumonia. But we should remember a normal chest CT does not exclude nCovid19 infection, patient may still have upper respiratory disease. CT can also suggest alternative diagnosis like pulmonary oedema as a cause for symptoms.

To detect complications

CT scan may be required in confirmed cases of nCovid19 pneumonia when complications are suspected clinically. These include pulmonary thromboembolism, pneumothorax, mediastinal/surgical emphysema, bacterial pneumonia, unexplained deterioration with new shadows in chest x ray. CT pulmonary angiogram is indicated when pulmonary embolism is suspected. In all the other cases plain CT should be done.

Pre-operative: This is for risk stratification and to identify nCovid19 pneumonia early. Pre-operative cases where emergency surgery is required, nCovid19 disease is suspected clinically, RT-PCR report awaited or not available CT thorax can be done.

Where chest CT is not essential

1. Chest CT scan is not indicated in asymptomatic patients or in patients with mild respiratory symptoms of nCovid19 with low risk. Anyone who is less than 50 years' age, without any comorbidities, no immunosuppression, mild disease in a high risk patient after 14 days of initial symptoms are classified as low risk cases.

2. In a confirmed case where chest x ray shows pneumonia, CT thorax is not essential if no complications are suspected.

3. Follow up CT scan is not required if patient is improving clinically and no complications suspected.

4. Lung involvement after 14 days of onset of first symptoms is unusual. Hence CT chest is not required even in high risk cases in the absence of any symptoms or signs of pneumonia after 14th day of onset of first symptoms.

Limitations of CT

Availability, expertise for interpretation, cost and radiation, non-portable, may not be feasible to repeat are the limitations. CT is not the standard for the diagnosis of nCovid19, but its findings help suggest the diagnosis in the appropriate setting.

Chest CT findings should be correlated with epidemiologic history, clinical presentation, and RT-PCR test results. Many other diseases can mimic nCovid19 pneumonia in CT and vice versa[6]. Typical or indeterminate features of nCovid19 pneumonia may be incidentally detected at CT performed for other reasons. In these cases, the interpreting radiologist should

discuss the possibility of nCovid19 with the referring physician in a timely manner.Chest CT should not be used as an independent diagnostic tool to exclude or confirm nCovid19. Chest CT can be done in stroke patients and myocardial infarction if nCovid19 is suspected as the predisposing event. Possibility of nCovid19 related cardiac injury should be kept as a differential diagnosis when pericardial effusion is depicted on chest CT images. A normal chest CT examination result does not exclude nCovid19 infection but excludes nCovid19 pneumonia. The proportion of false-positive chest CT examination results is substantial. This is due to overlapping of imaging features with numerous other diseases, including other viral pneumonias.The positive predictive value for chest CT is low (1.5% to 30.7%) in low-prevalence regions, and the negative predictive value ranges from 95.4% to 99.8% for Covid pneumonia[7]. Pooled sensitivity and specificity for chest CT is 94% to 96% and 37%, respectively.

Conclusions

Findings of CT scan chest should be correlated with history, physical findings, co morbid diseases and consider other differentials. Normal CT excludes nCovid19 lung involvement but patient may have upper respiratory involvement which may progress later to involve lungs. Diagnosis of nCovid19 infection should be confirmed by RT-PCR.

Post Covid pulmonary fibrosis

Fibrosis is a disordered wound healing process and may be directly related to the severity of an inciting event. Lung injury in COVID-19 is triggered by the virus and is immune-mediated. Severe lung injury leads to an increased risk of mortality and pulmonary fibrosis in survivors.

When to suspect post Covid pulmonary fibrosis

Post Covid pulmonary fibrosis should be suspected when a patient has persistent hypoxia requiring high flow oxygen beyond two to three weeks after the initial symptoms. Persistent respiratory symptoms, exertional dyspnea in particular, in the absence of non-respiratory causes for dyspnea or other pre morbid lung disease in patients who had Covid pneumonia require evaluation for post Covid fibrosis.

Risk factors

Age more than 60 years, severe illness, smoking, alcoholism, poor nutritional status, prolonged ICU stay, high Fio2, mechanical ventilation, diabetes mellitus and systemic hypertension are the main risk factors.

Investigations

Six-minute walk test may show desaturation. Spirometry may reveal restrictive pattern. DLCO will be reduced. High resolution CT scan thorax is the definitive investigation which will reveal the severity and extent of lung fibrosis. Careful history and evaluation is essential to rule out other causes for dyspnea. Severe anemia, preexisting lung disease, cardiac disease, psychological stress all can manifest with dyspnea after Covid.

Management

Systemic steroids in the early phase of the disease up to 10 days reduce the inflammation. Antifibrotic drugs like Nintedanib and pirfenidone may be useful in symptomatic and severe cases. Supplemental oxygen should be given in hypoxic patients. Pulmonary rehabilitation may improve the quality of life in severe cases.

References

1. Chen N, Zhou M, Dong X, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. Lancet. 2020 Feb 15;395(10223):507-13.
2. Geoffrey D. Rubin, Christopher J. Ryerson, Linda B. Haramati, Nicola Sverzellati, Jeffrey P. Kanne, Suhail Raoof et.al.The Role of Chest Imaging in Patient Management during the CO. VID-19 Pandemic: A Multinational Consensus Statement from the Fleischner Society. Radiology 2020 296:1, 172-180
3. Bhandary NM, Sharma V, Megha SN. Rapidly progressive dyspnea in an elderly diabetic. J Adv Lung Health 2021; 1:31-4.
4. Thomas C. Kwee , Robert M. Kwee. Chest CT in COVID-19: What the Radiologist Needs to Know. RSNA -Published Online: Oct 23 2020 https://doi.org/10.1148/rg.2020200159.

5. Hossein H, Ali KM, Hosseini M, et al. Value of chest computed tomography scan in diagnosis of COVID-19: a systematic review and meta-analysis. Clin Transl Imaging. 2020 Oct 12:1-13.
6. Azadbakht, J., Khoramian, D., Lajevardi, Z.S. et al. A review on chest CT scanning parameters implemented in COVID-19 patients: bringing low-dose CT protocols into play. Egypt J Radiol Nucl Med 52, 13 (2021). https://doi.org/10.1186/s43055-020-00400-1
7. Prakash J, Bhattacharya PK, Priye S, Kumar N. Post-COVID-19 Pulmonary Fibrosis: A Lifesaving Challenge. Indian J Crit Care Med 2021;25(1):104–105.
8. Ademola S. Ojo, Simon A. Balogun, Oyeronke T. Williams, Olusegun S. Ojo, "Pulmonary Fibrosis in COVID-19 Survivors: Predictive Factors and Risk Reduction Strategies", Pulmonary Medicine, vol. 2020, Article ID 6175964, 10 pages, 2020. https://doi.org/10.1155/2020/6175964
9. Peter M George, Athol U Wells, R Gisli Jenkins, Pulmonary fibrosis and COVID-19: the potential role for antifibrotic therapy. The lancet Respiratory medicine volume 8, issue 8, P807-815, august 01, 2020
10. Udwadia ZF, Koul PA, Richeldi L. Post-COVID lung fibrosis: The tsunami that will follow the earthquake. Lung India 2021;38, Suppl S1:41-7

DR. VISHNU SHARMA. M
Professor and Head, Respiratory medicine
A J Institute of medical sciences & Research Centre
Kuntikana, Mangalore, Karnataka, India
Phone +919448126321
Email: drvishnusharmag@gmail.com

Review article: Flow cytometry


In the era of modern medicine and targeted therapy, advanced laboratory tool like flow cytometry is always welcoming and promising. Flow cytometry is a widely accepted method which has its applications not only in the research labs but also in clinical laboratories. Its growth is fostered by more advanced developments in its design and function.

Flow cytometry is a technique which provides detailed information about a population of cells and their cellular characteristics, when suspended in a fluid and allowed to pass through the flow cell. The cells are labelled with fluorescent markers so that the light is absorbed and later emitted in a band of wavelengths. While the cells in single cell suspension are exposed to laser, the resulting light scatters are gathered and processed within the flow machine.

Even though, the first fluorescence-based flow cytometry was developed in 1968 by Wolfgang Gohde, the impedance-based flow cytometry device was designed much earlier by Wallace H Coulter in 1953 using Coulter principle.The original name of fluorescence-based flow cytometry was **pulse cytophotometry**which was later labelled as **"flow cytometry"**at the Conference of the 5th American Engineering Foundation in Pensacola, Florida. However, flow cytometry was a ground-breaking discovery that revolutionized the science of hematology, both in its diagnostic and therapeutic aspects.

Modern flow cytometers are able to acquire thousands of cells in real time, analyse and process the data. It uses 3 main technologies- **fluids, optics and electronics**, to study the cells and the data generated are analysed. Recent advances in immunophenotyping has enhanced the multi-colour analysis with refined gating strategies. Immunophenotyping by flow cytometry has its applications in various fields such as clinical medicine, molecular biology, virology, immunology and other research areas.

Various samples can be used for immunophenotypic analysis such as peripheral blood, bone marrow aspirate, cerebrospinal fluid and pleural, pericardial or peritoneal fluid. Homogenized lymph node tissue can also be used in cases of lymphomas and lymphoproliferative disorders. **Immunophenotyping by flow cytometry**where characterization of cell subpopulations is performed using antigen expression is most widely recognised in clinical practice. Flow cytometry-based immunophenotyping is used clinically for the diagnosis and subtyping of hematological diseases such as leukemia and lymphoma, diagnosis of myeloma and plasma cell leukemia, detection of primary immunodeficiency diseases by TBNK analysis, stem cell enumeration using peripheral blood, diagnosis of paroxysmal nocturnal hemoglobinuria, monitoring of immune system in HIV patients by quantifying CD4 and CD8 T-cells, monitoring patients on immunosuppressive therapy and patients with post-transplantation rejection, detection of anti-platelet antibodies in cases of immune thrombocytopenic purpura,diagnosis of inherited platelet disorders, HLA-B27 typing, diagnosis of hereditary spherocytosis, sepsis screen and detection of minimal residual disease in leukemias.

In conjunction with morphology, immunophenotyping can help in the diagnosis and classification of **Acute Leukemias.** A panel of antibodies used can detect the lineage such as myeloid or B-lymphoid or T-lymphoid. For example; B cell- CD5, CD10,CD19,CD20,CD45, Kappa, Lambda; T cell- CD2, CD3, CD4,CD5,CD7,CD8,CD45,CD56; Myelomonocytic- CD7,CD11b, CD13, CD14,CD15,CD16,CD33,CD34,CD45,CD56,CD117, HLA-DR; Plasma cell- CD19, CD38, CD45,CD56,CD138.

The subtypes of Acute Myeloid Leukemias like AML M1/M2, AML M4/M5, Acute Erythroid Leukemia, Acute Megakaryoblastic Leukemia can be identified. It is possible to detect certain types of AML with recurrent genetic abnormalities by flow cytometry; the classical example being Acute Promyelocytic Leukemia, which necessitates its early detection due to risk of fatal bleeding. AML with t(8;21) translocation can be detected by correlating morphology with immunophenotyping where AML case has aberrant expression of certain B-cell markers. Further, detection of minimally differentiated acute leukemia, rarer subtypes such as acute leukemia of ambiguous lineage and mixed-phenotypic acute leukemias is possible using immunophenotyping.

B-cell lymphoproliferative disorders can be diagnosed by immunophenotyping with detection of chronic lymphocytic leukemia, mantle cell lymphoma, marginal zone lymphoma, follicular lymphoma and diffuse large B-cell lymphoma. Hairy cell leukemia can be

diagnosed when circulating hairy cells are detected in peripheral blood. Monoclonality can be established by using kappa and lambda expression in B-lymphoid cells. Though rare, mature **T-cell lymphomas** such as adult-T cell leukemia/lymphoma, hepatosplenic gamma delta T cell lymphoma etc. can be diagnosed by immunophenotyping using a series of T-cell markers with TCRα/β and γ/δ T-cell subsets. Loss of surface T-cell antigens are common in T-cell lymphomas and may suggest neoplastic nature of the disease.

Flow cytometric detection of **minimal residual disease** is an essential method of monitoring acute leukemias on treatment where the lower levels of the disease beyond the limit of its morphological detection can be identified.

Stem cell enumeration by CD34 expression(especially in bone marrow transplant settings before infusion of stem cells) which are negligible in their number in peripheral blood, is performed using the ISHAGE guidelines.

TBNK analysis is critical in the diagnosis of **primary immunodeficiency disorders** where functional defects in T-cells, B-cells, NK cells and granulo-monocytic population can be detected using immunophenotyping.

Sepsis screen using CD64, HLADR, CD45, interleukins etc. can be performed which can identify sepsis much earlier compared to culture (time consuming and low detection rate).

Detection of **PNH** clone on red cells or granulocytes can be achieved using CD55, CD59, CD33, CD15 and CD45 markers.

Platelet analysis using immunophenotyping can aid in accurate counting of platelets, identification of inherited platelet disorders, monitoring anti-platelet therapy, platelet production in thrombocytopenia and diagnosis of heparin-induced thrombocytopenia.

Post-operative monitoring after **organ transplant**, where peripheral blood lymphocytes are analysed to detect early rejection, drug toxicity and monitoring efficacy of immunosuppressive therapy. T-cell lymphocyte **cross matching** prior to organ transplantation can be performed using flow cytometry which enhances the acceptance of engraftment.

HIV immune status can be monitored using enumeration of CD4 positive T cells using a single tube containing CD45/CD3/CD4/CD8 markers that accurately quantify the CD4+ cells.

Measuring the volume of **Feto-maternal Hemorrhage (FMH)** can also be done by Flow cytometry in addition to the Kleihauer Betke acid elution assay.

FLOW CYTOMETRY AND COVID-19

Currently, the world is facing **Coronavirus disease 2019** (COVID-19) pandemic caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2).There are two types of tests which are used for detection of current infection with SARS-CoV-2 virus- firstly, by detecting the genetic material of the virus by molecular testing using RT-PCR and secondly, antigen tests that detects known proteins associated with the virus. An accurate and reliable COVID-19 testing is essential to avoid further transmission of virus until the vaccination drive is successful and there is a definite curative treatment. RT-PCR continues to be the gold standard test for detection of SARS-CoV-2 virus; however, the test process is lengthy and has low throughput and false-positivity. Flow cytometry based method of detection of SARS-CoV-2 is an emerging technique of detection with higher accuracy. Specific fluorescent-labelled antibodies in flow cytometry has enhanced high-throughput of COVID testing.

Patients with COVID-19 presents classically with lymphopenia where there is a reduction in B and T lymphocytes which can be quantified by flow cytometry. Further in T-cells, the levels of CD8+ T cells are reduced significantly compared to CD4+ T cells. Going further, the flow cytometry based analysis of CD8+ T cells can demonstrate significant increase in activation markers on these cytotoxic T cells. Research into B cells have shown that the memory B cells are reduced in COVID-19. Lastly, monocytes show significant changes in COVID-19 patients with reduced levels of HLADR and is directly proportional to the severity of the disease.

Patients who show the symptoms of recovery from moderate and severe COVID-19 disease show increased CD3, CD4, CD8 T cells, increased expression of HLADR on monocytes compared to those who deteriorate.

Elevated interleukin-6 (IL-6) levels is a hallmark inflammatory signature seen in severe COVID-19 patients. High IL-6 levels is a portent of poor outcome for COVID-19 patients. COVID-19 patients in ICU should be monitored for IL-6 levels sometimes every 2 hours which aid in clinical decision-making. Flow cytometry based quantification of IL-6 is quick and allows rapid detection of patients who need the most care and keep them off ventilators.

To conclude, flow cytometry is a powerful tool in hematology which is essential for early detection and monitoring of hematological diseases. It detects multiple characteristics on single cells and provide a wide range of information. Flow cytometry, being both quantitative

and qualitative technique, has emerged as a standard clinical testing tool. One should remember that it is not a stand-alone method; however, it greatly enhances the diagnostic efficacy when it is coupled with morphological assessment and supported by molecular analysis.

Author: DR.SRIDEVI HB
Associate Professor, Department of Pathology
Co-Incharge Hematology, KMC Laboratory Services, (Flow cytometry in charge)
Deputy Quality Manager, KMC Laboratory Services
Kasturba Medical College, Mangalore
Manipal Academy of Higher Education.

Co Author: DR.AKSHATHA NAYAK.U
Consultant Hematologist,
AJ Hospital and Research Centre,
Kuntikana, Mangalore.

Listen To the Legend – An Interview with Dr Raghavendra Bhat (As Told To Dr Archana Bhat)

1. **Our beloved sir , could you please pen down a few lines about your journey of life with us**

First of all I do not consider myself an extra ordinary person- let alone a legend -- but as someone ordinary with some specific interests and skills

I was impressed by my teachers and in later career by some colleagues and students - inculcation of these observations have gone a long way in moulding my personality - I am ever grateful to them

I consider myself as a passionate teacher. To be a teacher, one has to be a lifelong student, which I am. Then who were my teachers - anyone whom I learnt any skill from - I learnt the insertion and removal of Foley catheter from a MNO, recording ECG from an ICU nurse, maintainable of the ECG machine from an Engineer to name a few. Then what did I learn from my teachers before passing out MD exam? Skills of communication, observation, data collection and interpretation - I was prepared for handling the actual patients. The grooming and fine tuning started then and is still going on!

My father Dr VR Bhat, pioneer in treatment of Tuberculosis was a staff member at KMC Mangalore where he started the Tuberculosis and Chest Medicine department and my mother Meera nurtured the entire family motivating all of us.

2. **Sir, something about medical education and journey in professional life**

When I completed MD, I was arrogant and confident - I was sure I knew whatever was required. This arrogance was born out of knowledge which was appropriate and most importantly, it never interfered with the respect that I had for my teachers

I stated my profession with a retainer salary, which necessitated me to practice Medicine - all my teachers did this - I really enjoyed it.

Private practice is like doing the Trapeze act in circus without the net - the sheer catecholamine drive arising from the uncertainties of this kept me going!

The career brought out the multifaceted personality and honed my skills - just as it did for my teachers and colleagues. This later got a name- Multitasking - I think our earlier generation who performed this with impunity could have patented this!

That is when I learnt the skill of observing and appreciating skills and abilities that others had which I did not. This was a great motivator throughout.

(One of the vintage pictures of KMC)

Achievements

Achievements are outcomes of ones skills and passion. Getting to see unusual clinical situations, being able to document these in the form of books and journal articles and getting some recognition and appreciation from these are my achievements. I sometimes feel guilty that I could have done more of each of these had I planned my career systematically - I must add that I have no regrets for not having done that as it added a flavour of uncertainty which basically motivates me to keep going against adversities.

I stated as a teacher. Somewhere along the way, I became a mentor - a loaded title with much responsibly. Teaching involves imparting learning skills - mentoring involves sharing life's lessons - as a mentor you are being observed and emulated constantly giving you a greater responsibility. As the years went by I got to be office bearer of professional organisations, social groups and eventually the department. I consider these as natural outcomes of my career than achievements.

(Dr B H Krishnamoorthy Rao , the founder president of API Mangalore with whom I worked for about 7 years and Dr E Keshava Bhat the face of modesty and the encyclopedia of ECG who graciously handed over his unit D to me in 1997)

Being able to mentor a student from US (whom I never met) to get a scholarship of the American College of Pathology was a glorious moment.

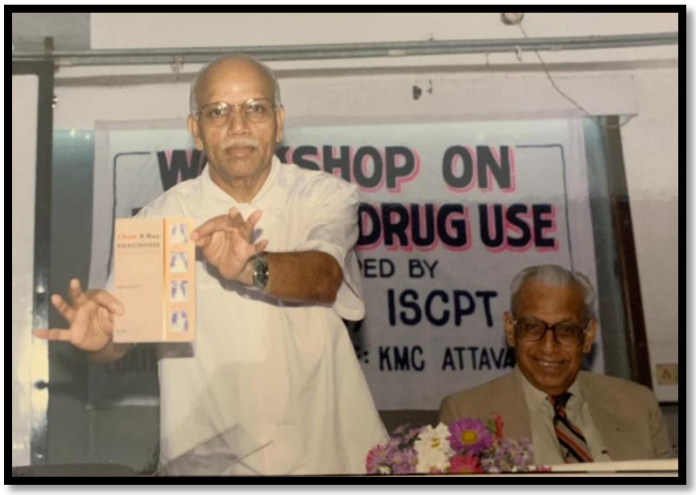
Getting the Fellowship is another memory I love to cherish thanks to the well-organized event and wonderful people of Glasgow.

3. Sir, kindly tell us about your passion and other hobbies

Writing was always close to my heart. As a teenager, I used to write articles to magazines, which also got me some degree of financial independence. This hobby helped me to improve general knowledge and communication skills. This skill was a great help in the later life in writing books and journal articles. The ability to express things in a different way helped me a lot in shaping my career as a teacher

A Tale of two mentors

Dr K P Ganesan the face of discipline and punctuality with whom I worked for 8 years and Dr B.M.Hegde the most adored teacher releasing my first book ever on Chest X-rays. He was the face of motivation and rubber off compassion among three generations of students.



(Visit by two editors of Davidson's textbook to department of medicine)

Other passions

I always loved cats. I still do. We have a mutual liking for each other!

I love reading. I have a collection of books

I love collecting material for teaching- have used in in writing books

I like to travel and visit places.

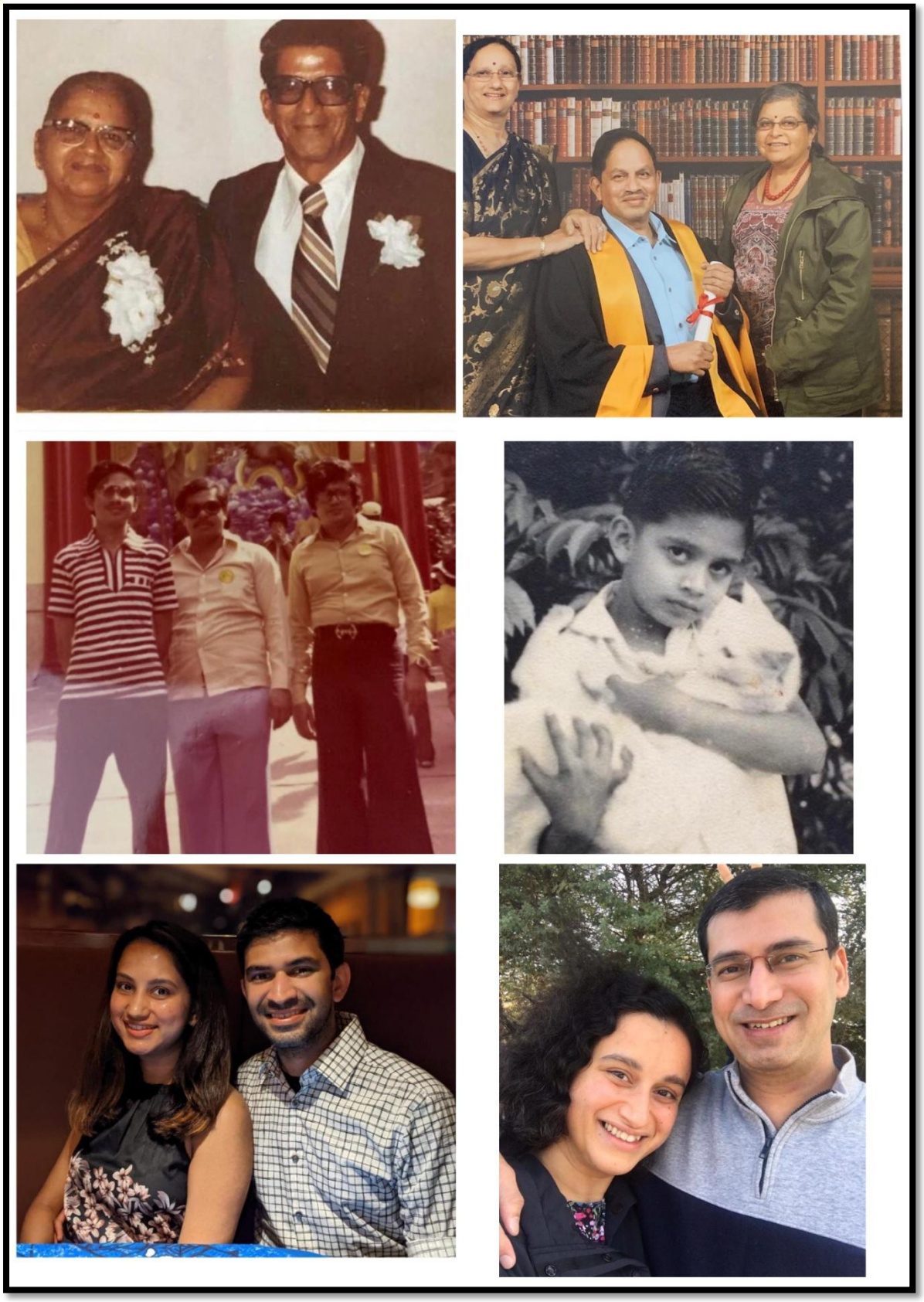
I like to interact with people from any social class, strata or occupation. This helped me in improving inter personal relationships.

4. Sir, let us know about your strengths in life

My wife Shobha is my constant motivator and support .My elder daughter Gita is an oncologist at Canada and my younger daughter Nita is an ophthalmologist at US.

5. Few lines about you and your message to the younger generation, Sir

Today I live away from my own place - I miss my career here - the "coffee club" of Wenlock Hospital" where we indulged in pulling each other's legs - the interaction acted as fuel for the rest of the day. I have some of the finest moments from the career at KMC the memories of which I cherish. I admire my colleagues who excelled in the skills I am not particularly good at - research and documentation. I also highly respect and adore my students who rose high in their own chosen fields.I enjoy interacting with actual living human rather than images – I do not own or miss a TV anymore.I still subscribe to and read an actual newspaper every day. I chose to salute all my teachers, which include the patients who selflessly promoted my learning of skills and enriched my knowledge without expecting any returns. I thank Dr Chakrapani, Dr Sadanada Naik and team API Mangalore for the opportunity given to share my thoughts.



DR RAGHAVENDRA BHAT
MD FRCP (Glasg)
Professor Internal Medicine
RAKMHSU, UAE

A Clarion Call to Save Grasslands

Each year, the United Nations celebrates June 5 as World Environment Day, with a special theme, to help world leaders and every responsible citizen, understand the importance of safeguarding Biodiversity. The theme for 2021 is 'Reimagine. Recreate. Restore' and its focal point is ecosystem restoration."Ecosystem restoration means preventing, halting and reversing this damage- to go from exploiting nature to healing it", according to the UN. This article throws light on a unique ecosystem, namely “Grasslands”, which are ecologically fragile and environmentally sensitive to change.

In an ever-expanding population of over one billion, humans fight for space, and invariably, it’s the wildlife space that is encroached upon. These ecosystems are facing multiple threats due to land-use change by human beings. These forest types often termed “**wastelands**” and **“degraded lands”,** are the most neglected, abused and least protected ecosystems by the Ministry of Environment and Forests, which looks after biodiversity conservation in India.Most of the States have excluded the grasslands and have not identified them as “deemed forest” which would otherwise categorize them under the purview of the Forest Conservation Act. According to reports of the Wildlife Institute of India (WII), less than 1% of the grasslands come under the Protected Area Network. Both, Policymakers and public citizens, have also paid scant respect to grasslands, which makes them vulnerable to pressure, from human populations. However, new scientific studies throw light on these forest types as crucial links for the overall success of biodiversity conservation. In fact, research data supports, the idea that sustainable use of grasslands, acts as building blocks for people and wildlife to live in harmony.

In India there are reportedly 11 types of grasslands, occupying 25% of India’s land area and provide 50 % of the fodder to the Country’s livestock. Many natural grasslands

(e.g. wet grasslands of terai, shola grasslands of the Western Ghats, dry grasslands of Deccan) have been earmarked even in Protected Areas. Some of the most threatened species of wildlife are found in these grasslands, many of which are disappearing. (E.g. There can be up to 350 species of wildlife or more comprising of mammals , reptiles and birds, depending on the type of vegetation. One can spot the Indian grey wolf, the striped hyena, the Bengal fox, Indian gazelle or Chinkara, Wild Cats, Rabbits, Indian Pangolin, Porcupine, wild boar, leopard, the Nilgiri Tar,blackbucks, the long-eared caracal, the critically endangered great Indian bustard and the endangered lesser florican and many other species, yet to be discovered. A dynamic balance exists in wildlife species, in these borderline forests, depending on the season of the year.

Grasslands also serve important catchment for rivers, streams, reservoirs, dams, check-dams and water bodies like ponds tanks and rivulets. These precious grasslands provide habitat for wildlife, in addition to water storage and watershed protection in improving the water table.

Grasslands provide protection against floods and droughts, have the potential to store carbon in the soil, and in turn, help increase overall climate stability. (The earth's land area covered by grasslands vary between 20 and 40 percent, yet, only a small percentage, less than 10% is protected due to political and economic reasons.) Threats to natural grasslands, as well as the wildlife, include unsustainable agricultural practices, farming, Plantations, grazing, and invasive species, illegal hunting, poaching, and climate change.

The shared spaces between human beings and wildlife in such a delicately balanced ecosystem imply that the conservation of all species of wildlife in these sensitive areas has to be socially inclusive. Easier said than done, but strategies need to be worked out, without any bias, such that there’s a high degree of coexistence between Man and wildlife. As you browse through this article, you can understand that this harmonious relationship, indeed works and coexistence is a reality. Thanks to the wisdom of the locals and their deep understanding of wildlife.

One interesting fact concerning the area in and around grasslands, is that in recent times, the forest types, are affected by the landscape change, due to semi urbanization and agriculture. Human imprint is clearly visible due to the accelerated or unbridled development in terms of habitat loss due to expanding human activities. The land use is changing to housing, Industry, and agriculture. Tens of thousands of acres of grasslands is giving way to onion and maize cultivation. Industry and housing are literally encroaching on wildlife habitats.

The Government has no doubt earmarked thousands of acres towards housing, setting up of Special Economic Zones (SEZ), Small and Medium scale Industry, and airports. The question of paramount importance is, whether development is planned on a scientific basis or is it

political pressure that is dictating policy decisions. How then do we strike a fine balance between sustaining both human development and biodiversity?

Forest Department and Afforestation Measures

Unfortunately, the Ministry of Forests, considers increasing green cover in grasslands, by planting trees, as a proactive environmental conservation measure. In reality this spells disaster to the entire fragile ecosystem. Monoculture plantations of non-indigenous, commercial species such as Mangium, Mesopsis, eucalyptus, acacia and teak, all of which are counted as forests but shouldn't be. These trees change the predator prey behaviour, displacing the local flora and fauna in favour of exotic and invasive species.

Solutions to address Human Animal Conflict

From what we have observed over the years, the habitat around grasslands is subjected to both high human impact zones, where the industry is located and low impact zones where villagers border the wilderness zone and grassland habitats. In the past two decades due to housing all along the banks of rivers, thickets which were the favourite haunt of the lesser-known mammals have resulted in the disappearance of the jungle cat. As more and more land is transformed into commercial crops, it has impacted the carrying capacity of the ecosystem and has resulted in habitat degradation and disturbance of wildlife.

One time tested method accepted to address this problem, is to conserve separate areas as a Reserve for wildlife and develop other areas for human habitation and Industrialization. Yet another model, involves the merger of the two areas by developing small pockets of conducive habitats for wildlife within the newly developed zone. However, this model has been a total disaster because its implementation is not scientifically done. The success of this model rests heavily on first understanding the ecological behaviour of wildlife.

Farmers to the rescue of wildlife

Farmers living in these borderline areas, make it a point to leave behind on purpose, their old livestock like bullocks/buffalos/sheep to graze in the transitional or fringe areas of the forest. This has been an age-old practice in the surrounding villages. These old livestock provides prey for leopards and other mammals. The understanding has gone a long way in mitigating human-wildlife conflict because leopards and other carnivores do not come and steal healthy livestock from farmers.

Conclusion

Protection, restoration and sustainable use of grasslands are important policy and ecological imperatives.In recent years, a number of scientific studies has revealed that grasslands contain multitudes of wildlife species that are uniquely adapted to live in; only such specialized habitats. Any man-made change can result in the disappearance of many of these species. The Ministry of Environment should conduct more scientific research and use better technology that will help distinguish each habitat, before they are converted to Special Economic Zones. The Country needs development, but it should not be at the cost of environment. Development, needs to be properly planned and sustainable. Over the years, the impact of climate change and global warming has resulted in the destruction of many complex sensitive ecosystems, but grasslands has withstood the impact because of the resilient ecosystem. However, the bigger threat is the indirect impact of urbanization on grasslands. A proper scientific study will help wildlife, coexist with man.

DR ANAND TITUS PERIERA
Ph.D.Microbiology , USA

GEETA NANAIAH PERIERA
M.S.Horticulture
Oklahoma state university, USA

ST. ALOYSIUS CHAPEL – A MARVEL TO BEHOLD!

I had the privilege of studying in St. Aloysius for twelve years, and during these years it was a routine to visit the Chapel before attending classes. The routine was such that the entry and exit from the Chapel, along with a hurried prayer which probably only the good Lord would have understood, would not last more than a minute. The Chapel would be crowded before exams, with students of all faiths devoutly praying, which I am sure would have impressed even St. Aloysius!

St. Aloysius Chapel is located on the top of Light House Hill and it closely resembles the Sistine Chapel in Rome. The walls and ceiling of this Chapel has paintings just like the Sistine Chapel. **It was b**uilt in 1885 by Rev Father Joseph Willy and its interiors painted by the Italian Jesuit, Bro. Antonio Moscheni in 1899-1900. Bro. Antonio Moscheni was born in Italy on January17, 1854. Fresco painting was his passion, but in 1889, he renounced a painting career and took up religious work. His religious superiors did not wish his talents to be lost and ordered him to paint several churches in Italy before sending him to Mangalore in 1899, to the Chapel of St. Aloysius College. It took him a little over two years to cover the walls and ceilings of the Chapel with paintings. After completing the St. Aloysius Chapel, his superiors had intended to call him back to Europe, but his fame had spread all over India and he was invited to various places. In 1905 he was called by the Bishop of Cochin. Just after completing the work in the sanctuary of the Cochin Cathedral, he fell sick with dysentery that ultimately proved fatal. He died on 15 November 1905 in Cochin, Kerala, and was buried in the Jesuit cemetery there.

Virtually every inch of the ceiling and the walls of the Chapel are covered with paintings. The Chapel has a main hall and two aisles on either side of the hall. The raised platform is called the sanctuary, with the main altar touching its walls. There are two types of paintings in the Chapel - fresco and canvas. A fresco is painted on fresh wet lime plaster walls. The colours get embedded in the lime plaster as it dries up. Frescos cover about 600 square metres of the walls of the Chapel. The paintings on the ceilings in the Chapel cover about 400 Square Metres and are in oil on canvas. The paintings on the ceiling depict the life of St. Aloysius Gonzaga to whom the college and chapel is dedicated. His earlier life is shown in the first three panels from the rear, the paintings include:-

1. Aloysius as a child promising at the Altar of Mary in Florence to dedicate his life to God.
2. Aloysius preaching about God to his townsfolk.
3. First communion of Aloysius.

The fifth panel shows Aloysius seeking admission to the Jesuit Order. The rest of his life is depicted on the wall behind the altar. The central picture behind the altar depicts him serving the plague stricken in Rome. He contracted the disease and died at the age of

23.

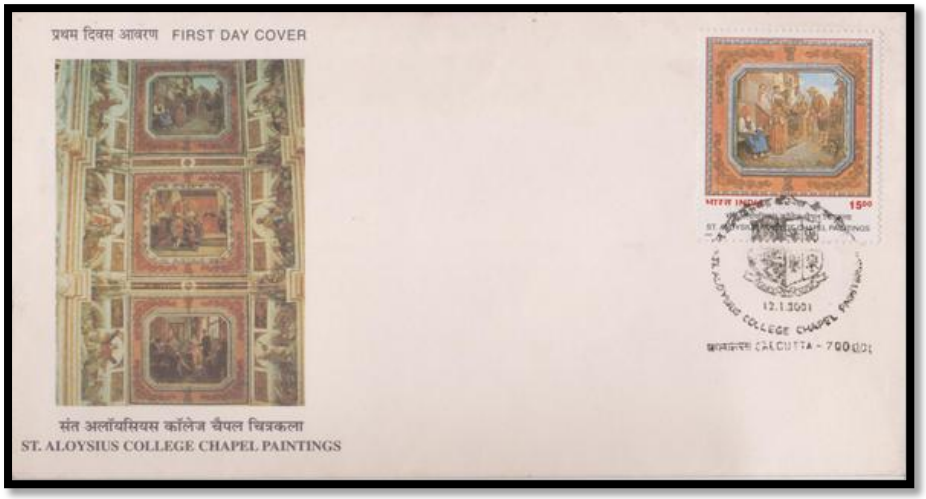
The sloping ceiling panels on either side portray the Apostles. Garlands are weaving through the different panels with no two garlands having the same flowers. The angels who hold the garland are life size.

The upper arches depict the great saints of the Church and the lower arches depict Jesuit saints. The largest painting in the Chapel is on the rear wall. It shows Jesus as the friend of children. It is considered to be the masterpiece of Moscheni.

There are many paintings some of which are on the life of Jesus:

1. The birth of Jesus.
2. Jesus being baptised by St. John the Baptist.
3. The wedding feast at Cana, where Jesus changed the water in the six pitchers into wine.
4. The Crucifixion of Jesus between two thieves on Calvary. Mary, the Mother of Jesus and Magdalen, are at the foot of the Cross. A soldier, Longinus, pierces with a lance the side of Jesus. The artist's controlled use of light shows that there was darkness and lightning.

A commemorative postage stamp on the paintings of St. Aloysius Chapel has been issued by the postal department on January 12, 2001.



CALL FOR ARTICLES

Readers are hereby requested to submit their articles for the next issue.

Submit to : editorapidk2020@gmail.com

Author instructions@page 89

The paintings had suffered damage due to the humidity and dust. The work of restoration was done by specialists of INTACH Indian Conservation Institute, Lucknow, from 1991 to 1994. Experts from the institute again visited the chapel in 2016 and conducted a detailed study of the condition of the paintings. The restoration work was done again in 2017.

A visit to this Chapel is a must for the residents of Mangalore and tourists visiting Mangalore. Indeed it is a marvel to behold!

DR C.C. PAIS
Professor, Medicine
Wenlock Govt Hospital

Acknowledgements

Members of editorial sincerely thank Mr Manish K.S. , Research Associate, Dept. of Discovery Biology, Syngene Intl. Ltd, Biocon Park, Bangalore for his valuable digital art contribution to our cover page.

AUTHOR INSTRUCTIONS

GUIDANCE FOR AUTHORS AND CONTRIBUTORS

API DK LAHARI is a quarterly published e magazine of API D. K. CHAPTER , released in the www.apidk.org website with archival options of all the issues released stored in pdf format (each issue) also with download option .The magazine will include academic and nonacademic articles .The languages included will be English and kannada.We are hopeful that this will give a unique opportunity to all API members to share their vision and views on various aspects of our profession and beyond.

Contact details:

Dr Kishan Delampady,

Consultant endocrinologist

Assistant Professor, Dept of Endocrinology

AJ institute of medical sciences

MANGALORE- 575004

Tel: ……9480282884……..

Website: ……www.apidk.org……..

Submission Email Id:editorapidk2020@gmail.com

Instructions on preparation of the manuscript to be submitted

1. Manuscript may be in English/Kannada.
2. Font size -12 (Times New Roman), doublespacing, 1.5 inches margins all around the page.
3. All the write ups should include a Title page with author information
4. Title Page should contain the following :Full name/names of all the authors with contact address, cell number, email id, designation, position in the Institution and a passport sized recent photo

Paper/write up categories

1. Scientific articles
2. Member's accomplishments
3. Obituaries
4. News and Views
5. Residents corner
6. View point
7. Medico legal pearls
8. Journal Watch
9. Patient page
10. Listen to legend
11. Life beyond medicine [Non-medical topics]
12. General health articles [more for lay public]

Scientific articles

Case reports

Word count- 1500, Maximum of 03 tables & or figs, 07 Refs

Review article

Word count- 3500, Maximum of 5 tables or figs

Academic challenge

An interesting case presentation with detailed academic discussion

Abstract, word count -3500, Maximum of 5 tables or figs

Diagnostic test and interpretation

Word count- 1500

Images in Medicine

Photos with goodresolution and quality, Word count -500

Abstract is required for case report, Review article, Academic Challenge, and Diagnostic test and interpretation. Word count is inclusive of abstract.

References should be in Vancouver style.

Member's accomplishments

Brief information by self or others on the accomplishments of our API members in profession, public life, academics and other walks of life

Word count- 1000

Obituaries

Condolence message and short write up on the deceased member, one message -500 words

News and Views

Write up on medical happenings with a personal opinion expressed

Word count -1000

Resident's corner

Medical article by post graduates/interns

Word count as per the criteria mentioned for the scientific articles by the members

View point

Write up on various problems or happenings in field of medicine or medical profession

Word count -1500

Medico legal pearls

Articles on medical legal aspects of including consumer protection act and other acts applicable to the medical profession

No word limits

Journal Watch