Issue : July - Sept. 2024 / Vol. 2. No. 3

CNCI Bulletin

CHITTARANJAN NATIONAL CANCER INSTITUTE (KOLKATA)

(An Autonomous Body under Government of India, Ministry of Health & Family Welfare, Regional Cancer Centre)

DIRECTOR'S MESSAGE

Dr. Jayanta Chakrabarti

Director,

Stronger Together: United against Lung Cancer Awareness

Everyone Deserves Access to Cancer Care

Lung cancer remains one of the deadliest and most prevalent diseases globally, despite medical advancements. Delayed diagnosis, lack of support, and stigma surrounding the disease exacerbate its spread. World Lung Cancer Day aims to break down these barriers, promoting early detection, supporting affected individuals, and encouraging healthier lifestyles.

The 2024 theme, "Close the Care Gap: Everyone Deserves Access to Cancer Care," emphasizes the urgent need for increased research, improved treatment options, and comprehensive support for patients. According to the World Health Organization (WHO), lung cancer claims more lives annually than many leading cancers combined, highlighting the need for heightened awareness.

Lung cancer risk factors include smoking (including passive or second hand smoking), exposure to radiation therapy, radon gas, asbestos, and other carcinogens, obesity, and family history.

To combat lung cancer, the Indian government has launched several initiatives:

The Union government has continued its emphasis on tackling non-communicable diseases and allocating funds for research in the healthcare sector. Finance Minister Nirmala Sitharaman announced customs duty exemptions on three cancer treatment drugs – Trastuzumab Deruxtecan, Osimertinib, and Durvalumab – in the Union Budget 2024-25.

Other key initiatives include:

National Tobacco Control Programme (NTCP) to reduce tobacco consumption through awareness campaigns, regulatory measures, and support for cessation programs.

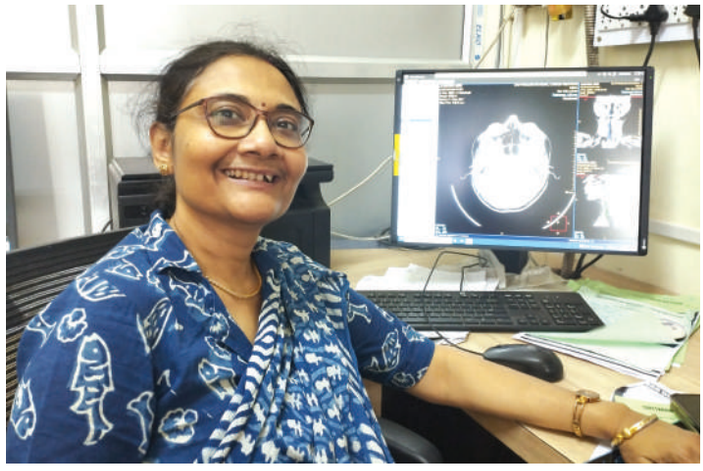
Swachh Bharat Abhiyan to reduce air pollution and enhance public health by promoting cleanliness and sanitation.

Preventing lung cancer involves reducing risk factors and making healthy lifestyle choices, such as:

Avoiding tobacco use, testing for radon gas, using protective equipment at work

Undergoing regular screening if at high risk. As we observe World Lung Cancer Day 2024, let us unite to create a lung cancer-free world and support those affected. Through education, advocacy, and collaboration, we can combat lung cancer and strive for a healthier future.. Let us pledge to make a difference – today and every day.

From Editors Desk



Dr. Suparna Mazumder,
Prof. & HOD, Radiology

Dear Readers,

We have recently concluded our 78th Independence Day celebrations and September is upon us. An important landmark day in September is World Patient Safety Day,celebrated on the 17 Th of the month. It started from the year 2019 as per a resolution "Global action on patient safety" taken in the 72nd edition of the World health assembly held in May 2019 (WHA72.6).

The theme for 2024 -Improving diagnosis for patient safety, with the slogan "Get it right, get it safe"

Patient safety is defined as "the absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum".

Our motto should be - **FIRST, DO NO HARM.**

Common factors associated with patient safety are the following:

1. Medication or surgery related
2. Infection/sepsis
3. Diagnostic errors
4. Venous thromboembolism
5. Pressure ulcers
6. Unsafe injection /transfusion practices
7. Patient mis-identification

On a wider perspective it may also be related with the following:

1. Existing system and organizational factors
2. Technological factors e.g. health information system
3. Human factors and behavior e.g. communication , cognitive bias,fatigue
4. Patient related e.g. poor literacy, non-adherence to treatment
5. External factors e.g. economic, environmental

Systematic approach to improve patient safety may be adopted as below:

a. Leadership commitment where safety is prioritized
b. Safe working environment for all concerned
c. Building competent workforce, efficient teamwork
d. Engaging patients and their families in patient related decisions and treatment
e. Establishing systems for patient safety incident reporting and learning for continuous improvement

LIGHT UP THE WORLD IN ORANGE THIS 17TH SEPTEMBER

Improving Diagnostic Precision for Safer Patient Care

Dr. Sankar Sengupta
Medical Superintendent and Professor & HOD,
Department of Laboratory Medicine,

As the World Patient Safety Day is on September 17th, healthcare professionals and stakeholders come together to address a pressing concern: the imperative of accurate diagnosis. This year's focus "Improving Diagnosis for Patient Safety", underscores the need for precise and timely diagnosis to safeguard patients from harm and promote exceptional care. The slogan "Get it Right, Make it Safe" emphasizes the need for precise and timely diagnosis to ensure patient safety.

According to the World Health Organization (WHO), early diagnosis is pivotal in identifying health problems. The diagnostic process requires collaboration between patients and healthcare teams, involving discussions, examinations, testing, and result analysis. Errors can occur at any stage, leading to delayed or incorrect diagnosis, prolonged illness, disability, and even death.

This year's Patient Safety Day highlights the vital role of correct and timely diagnosis in improving patient safety. Healthcare workers, leaders, and policymakers emphasize the importance of accurate diagnosis before intervention.

In oncology, laboratory medicine, imaging techniques, and nuclear medicine play crucial roles. Advances in immunotherapy, PET-CT scans, and next-generation sequencing (NGS) have revolutionized cancer treatment.

At CNCI, we strive to provide exceptional diagnostic services for cancer patients across the eastern India. Improving diagnostic care is of paramountimportance, focusing on minimizing - delayed, incorrect, or missed diagnosis that can alter treatment protocols.

The National Medical Council has mandated training on Good Clinical Laboratory Practice (GCLP) for postgraduate students and faculty in laboratory medicine, pathology, microbiology, and biochemistry.

By prioritizing accurate diagnosis, we can ensure patient safety and deliver high-quality care.

Key highlights of this year's patient safety day are -

1). World Patient Safety Day: September 17th - Laboratory & imaging is on focus.

2). Theme: Improving Diagnosis for Patient Safety

3). Slogan: Get it Right, Make it Safe

4). This patient safety day stresses on

- Importance of accurate and timely diagnosis

- Collaboration between patients and healthcare teams

&

- Advances in oncology diagnosis and treatment

5). Mandatory GCLP training for healthcare professionals has been announced by NMC of our Country.

Cancer, Bone & Blood- A challenge for Anaesthetist

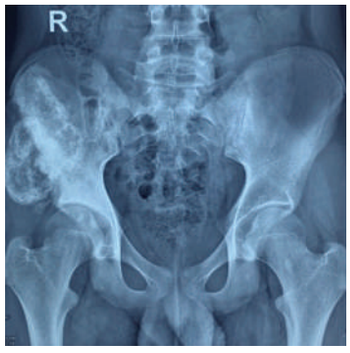
Dr. Deepa Chakrabarti,

Prof. & Head of the Department,
Anaesthesiology & Critical Care

Bone sarcomas constitute 0.2% of all malignancies diagnosed in the United States, according to Surveillance, Epidemiology and End Results (SEER) Cancer Statistics Review of the National Cancer Institute. Ewing's sarcoma and osteosarcoma are most commonly seen in first two decades, while, tumours like chondrosarcoma, malignant fibrous histiocytoma, chordoma and secondary osteosarcoma have their incidence mostly after fourth decade. At present, all bone tumour in the extremity should be treated with limb salvage if adequate margin and acceptable degree of limb function is ensured.

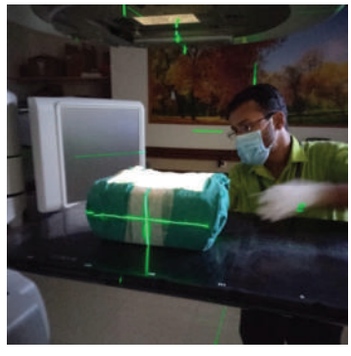
There is paucity of literature in anaesthetic experience in these limb salvage surgeries.Challenges faced were mainly to combat huge intraoperative bleeding, requiring massive blood product transfusion and thus keeping in guard with complications thereof, like TRALI and coagulopathy. Since, most of these cases fall under paediatric age group, to maintain hemodynamic stability with such huge blood loss and prolonged surgery is a challenge too.Preoperative embolization is a choice here if team of surgeon and anaesthetist thinks that resection of tumour is going to cause massive bleeding.

Extracorporeal irradiation (ECI) is relatively a rare method used in the management of malignant bone tumours (MBT). It consists of en-bloc removal of the tumour bearing bone segment, removal of the tumour from the bone, irradiation of the bone, and re-implantation back in the body. It can be done in two stages, if patient is hemodynamically unstable, provided Bone Bank is available. The delivery of very high doses of radiation to tumor(50gY) bearing bone by ECI is an advantage, which is otherwise not possible in the intact bone. Other advantages are anatomically size matched graft for biological reconstruction. It is cost effective as compared to the prosthetic devices and it has psychological advantage too.



Recently, in our hospital, we had done two such cases of ECRT(1sttime done in the state) of whom one is worth mentioning. A 17 year old male, post chemotherapy and low BMI was posted for excision of osteosarcoma rt ileum bone with intraoperative ECRT plan .During hemipelvectomy and pelvic dissection, there was a huge blood loss of approximately 1 L leading to asystole of the patient after all standard precaution taken. Massive blood transfusion protocol was initiated. Patient was made supine and CPR given, ROSC achieved after two cycles.It is to be mentioned here that cell salvage cannot be routinely used because it may increase the risk of spreadingor showering tumour cells systemically. Our patient was not a case of autologous blood transfusion or ANH since he was treated for anaemia preoperatively. Tranexamic acid infusion started preoperatively to reduce blood loss. Decision of continuation of the surgery after ROSC is taken by both surgical and anaesthesia team after patient became stable with blood product transfusion. Epidural anaesthesia has been chosen to be more affective for pain control in such cases.The patient developed severe hemodynamic instability and metabolic acidosis in postoperative period, managed with three vasopressors and methylene blue. Patient was discharged from ICU after 5days.

Intraoperative ECRT combined with reconstruction represents an integrated approach to managing bone tumours, with the goals of achieving optimal tumour control, preserving skeletal function, and maximizing patient outcomes. This multidisciplinary treatment strategy requires close collaboration between surgical, radiation oncology, and other specialty teams to deliver personalized care tailored to each patient's unique needs.



Ackowledgement-

Department of Breast and Soft tissue Surgery

Department of Gastro-Intestinal and Genito-urinary Surgery

Department of Radiation Oncology

Department of Anaesthesiology

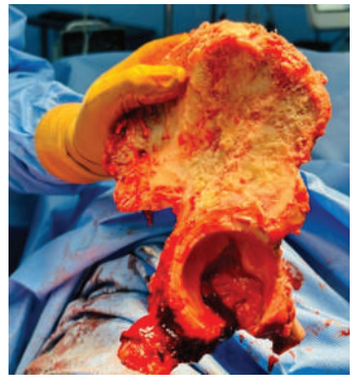
Department of Critical Care Services

CHITTARANJAN NATIONAL CANCER INSTITUTE (CNCI)

17 years old boy from Bolpur, Shantiniketan presented with complaints of right hip pain and swelling for 3 months. He was diagnosed with a cancer of pelvic bone, namely osteosarcoma. Osteosarcoma is considered one the deadliest cancer of the bone. He was given neoadjuvant chemotherapy and was prepared for surgical excision of the tumor. In pelvis the reconstruction after the tumor excision is challenging.

One of the options which is cost-effective and worldwide recommended is Extra-Corporeal Irradiation and Reimplantation (ECIR) synonymously called Extracorporeal Radiotherapy (ECRT). In ECIR/ECRT, we excise the tumor with proper margins. Then this specimen is prepared and transported to radiation. The specimen is subjected to a very high dose of radiation extra-corporeally, i.e outside the body. This high dose of radiation kills all the cancerous and normal cell in the specimen. This irradiated dead bone is then re-implanted into the body. The fixation of this done like any normal fracture fixation, with plates and screw.

In this case we did a right hemipelvic resection, gave extracorporeal radiation and re-implanted the right hemipelvis to its original position.



Evolution of the staging process of Lung Cancer

Dr. Tapas Maji,
Prof. & Head, Department of
Radiation Oncology

Anatomic staging of cancer in terms of Tumor (T), Node (N) and Metastasis (M) reflecting extent and burden of tumors, mainly helps in deciding local treatment strategies (surgical resection & radiotherapy) along with the prediction of survival and prognosis. However, decision ofmultimodal treatment, globalcomparison of outcomes and prognostication necessitate consideration of wide range of pathological and biological factors. In this respect TNM classification should neither be considered as a prognostic model nor as a treatment determining tool according to the nomenclature of stage. It merely enables communication.

The credit of conceptualization ofTNM classification goes to Prof. Pierre Denoix at the Institute Gustave-Roussy in early 1950s under UICC and first publication of the pocket book, Livre de Poche, was released in 1968. Around the same time, the FIGO classification of gynaecological malignancies was published and AJCC began publishing separate definitions of TNM categories from 1977. In 1987 the UICC and the AJCC TNM classifications converged at their 4th edition. Thereafter, an agreement between the UICC, AJCC and FIGO ensured compatibility of TNM classification and staging for gynaecological as well as other cancers.Gradually, in the last few decades, histological grade was incorporated into soft tissue sarcoma, bone and prostate tumors; age and histology into thyroid tumors; Serum markers in testis and gestational trophoblastic tumors and HPV in H & N tumors. Currently an increasing number of biologic and genetic prognostic factors are being identified for many different tumor sites those are found to produce different prognoses and outcomes to therapy. To decide changes to be introduced into the TNM classification, consensus of internationally recognized site-specific panels of experts is availed. The process includes standardized review of any proposal for changes and analysis of literature to identify new knowledge suggesting the need for changes.

TheTNM Staging and classification for Lung Malignancies appliestoprimarylung carcinomas, includingnon-smallcell lungcancer, small cell lungcancer, andbronco-pulmonarycarcinoid tumors. Itdoesnotapplytopulmonarysarco masor lymphomas. Staging of lung cancer was first published in the 2nd edition of UICC manual (1975) and 1st edition of AJCC (1977) based on the North American data base of 2155 patients analyzed in a seminal article by Mountain et al. in 1974. The survival curves of the different T (1,2,3), N (0,1,2), and M (0,1) categories and of the three stages were so clearly different that no statistical comparisons were made and no p values derived.

Stage IV was introduced in the 3rdedition of UICC manual (1978) considering distant metastatic disease. In the 4th edition of combined AJCC & UICC manual (1987), Stage III was subdivided into IIIA (T3 and N2) and IIIB (T4 and N3) after introduction of T4 and N3 categories, based on another article by Mountain et al. analysing 3753 patients.In the 5thedition of the AJCC Cancer Staging manual (1997), Stage I was subdivided into IA (T1N0M0) and IB (T2N0M0) and Stage II into IIA (T1N1M0) and IIB (T2N1M0, T3N0M0) considering a larger North American database of 5319 patients, analysed by Mountain et al. The 6th edition of the Manual (2002) made no changes from the previous edition with regard to lung cancer. As a result, the staging of lung cancer through the 2000s followed the AJCC 5th editionbased on evidence from a single institution with a relatively small database of NSCLC patients primarily treated surgically.

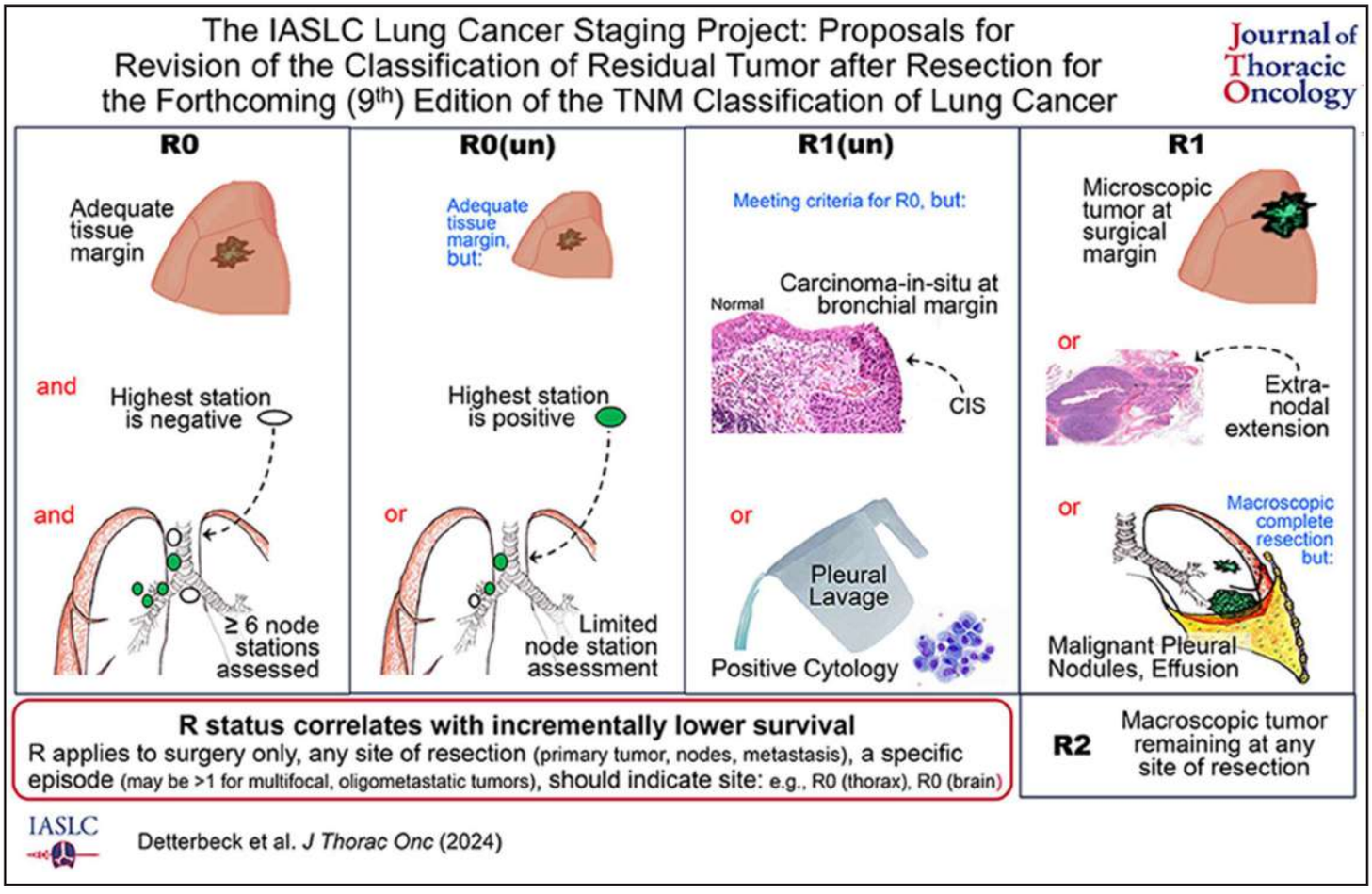
Categorization of the mediastinal nodal status was realized to bethe pivotal step in the accurate assessment of patients who were potential candidates for curative thoracic surgery for NSCLC. Advanced imaging techniques (CT and PET) and minimally invasive diagnostic surgical procedures (EBUS TBNA, VATS and robotics)became the standard for clinical staging. During development of the 7th edition of the AJCC manual (2009), the necessity of a major revision of the descriptors for lung cancer staging became evident.A retrospective international database including 81,495 evaluable patients collected from 1990 to 2000 by the International Association for the Study of Lung Cancer (IASLC) and analysed by Cancer Research and Biostatistics (CRAB) was used for the revision. The IASLC established a Lung Cancer Staging Project with staging subcommitteesto revise both the TNM descriptors and stage groupings. The AJCC 7th edition reclassifiedtumor size into the more refined T subgroups of T1a, T1b, T2a, and T2b and assigned T3 for tumors greater than 7 cm in size, allowing clinicians to select treatment options based on a patient's tumor size and evaluate their clinical outcomes. The presence of multiple tumor nodules, a negative prognostic factor, was down-staged from T4 to T3 (if in the same lobe) and from M1 to T4 (if in different lobes of the same lung). In addition, the presence of malignant pleural and pericardial effusion, another adverse prognostic factor, was upgraded from T4 to M1a.The residual tumor (R) classification, related to completeness of resection, was also revised in this edition.The revisions were subsequently validated by the dataset from Surveillance, Epidemiology and End Result (SEER) program of USA.

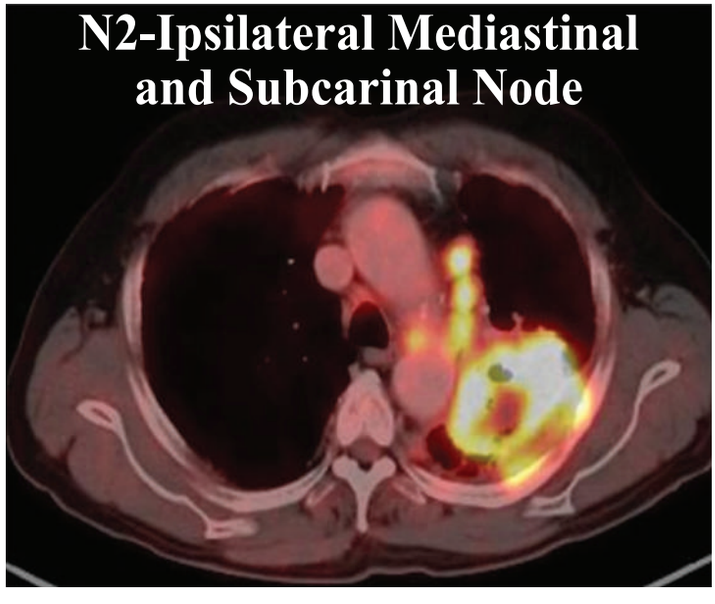
Major developments in the staging of lung cancers again appeared in the 8thedition of AJCC manual (2017).For the T1 and T2 categories, subdivisions with monocentric increments were created. T1 still includedtumors until 3 cm with three subcategories T1a, T1b and T1c with cut-off values of 1, 2 and 3 cm, respectively. T2 comprised T2a and T2b with tumors till 4 and 5 cm, respectively. T3 describedtumors between 5 and 7 cm while tumors larger than 7 cm were included in the T4 category. The survival curves of these T subdivisions nicely separated and these new categories became relevant for daily practice. Involvement of the main bronchus was made to be a T2 descriptor, regardless of distance from the carina, but without invasion of the carina. Partial and total atelectasis or pneumonitis was seen as a T2 descriptor; Diaphragm invasion was reclassified as T4. Mediastinal pleura invasion as a T descriptor was deleted.Regarding the measurement of tumor size,it was agreed upon to measure the largest unidimensional size with lung window settings on CT scan. For subsolid nodules, suggestive of non-mucinous adenocarcinoma, a major change included measurement of only the solid part to determine clinical tumor size as is performed for other tumors as breast cancer. This mostly corresponded to the invasive part on pathological examination allowing a radiological-pathological and clinical correlation.No changes

were made in the nodal map and N component but new categories were suggested for further analysis, subdividing the N1 and N2 descriptors into involvement of single or multiple lymph node stations.For metastatic disease (M descriptor) the new M1b category comprised patients with only one metastasis in one distant organ, whereas M1c implied multiple distant metastases in one or several organs. The residual tumor (R) classification, related to completeness of resection, was revised in the 7th edition specifically for lung cancer resection and was maintained in the 8th edition.

Recently AJCC have announced a change in nomenclature of its staging manual from "Cancer Staging Manual" to "Cancer Staging System" and moved away from "editions" to "versions"from the 9threvision. The updated AJCC Version 9Cancer Staging System will go into effect from 1st January 2025. The Stage Group Subcommittee of the IASLC - Staging and Prognostic Factors Committee (SPFC), has worked on a new database prospective and retrospective, especially collected to update the TNM categories and descriptors of Version 9 Cancer Staging System. Weightage has been given on nodal and metastatic tumor burden and therefore changes has been proposed for N and M descriptors.N2 is subdivided intoN2a (single nodal station involvement) and N2b (multiple nodal stations involvement in the mediastinum). M1c is subdivided into single and multi-organ system involvement and the final M descriptor became M1a (intrathoracic metastases), M1b (single extra-thoracic metastasis), M1c1 (multiple metastases in a single organ system), and M1c2 (multiple metastases in multiple organ systems). All these changesresulted in a rearrangement of T and N categories included in the stage groups IIA, IIB, IIIA, and IIIB.

Advanced methods of targeting and fractionation of radiotherapy (SRS and SRT), and the emergence of molecular targeted therapies and immunotherapy have made a significant impact on the outcome of people with NSCLC. So, themain challenge for subsequent editions is the consideration of specific anatomical factors with detailed immunohistochemically data and inclusion of biomarkers and mutational changes in the system.





Oncologic Critical Care: A Chronicle of Dignified Deaths to Glorious Revivals!!!

Dr. Dibyadip Mukhopadhyay,
Specialist Critical Care Grade II,

Historical Context

Historically, critical care for cancer patients was limited, with many oncologists hesitant to admit patients to intensive care units (ICUs) due to concerns about the effectiveness and appropriateness of such interventions. Initial reports indicated that critically ill cancer patients often did not benefit from intensive care, leading to restrictive admission policies.

Challenges in onco-critical care

Treating critically ill cancer patients in intensive care units (ICUs) presents several challenges due to the unique complexities associated with their conditions. The main challenges include:

1. Heterogeneity of Patient Population

Cancer patients in ICUs often exhibit a wide variety of malignancies, treatment histories, and comorbidities, leading to a heterogeneous population. This diversity complicates the assessment of prognosis and the effectiveness of intensive care, as different cancers and treatments may have varying impacts on outcomes.

2. Admission Criteria and Prognostic Uncertainty

There is no universally accepted scoring system to predict outcomes for critically ill cancer patients, making it difficult to establish clear admission criteria for ICUs. Traditional predictors of mortality have become less reliable in this population, and the decision to admit a patient often hinges on subjective clinical judgment rather than objective measures.

3. Management of Organ Dysfunction

Critically ill cancer patients frequently experience acute organ dysfunction, which necessitates prompt and effective management. However, the complexity of managing these dysfunctions - often exacerbated by cancer treatments - requires a deep understanding of both oncology and critical care. The timing of ICU admission is crucial, as early intervention can significantly affect outcomes.

4. Integration if Cancer Specific Treatment

Administering cancer therapies, such as chemotherapy in ICU poses additional challenges. The interaction between life-sustaining treatmentand cancer specific therapy must be carefully managed.

5. Resource Limitations

ICUs often face limitations in resources, including bed availability and staffing. This situation can lead to difficult decisions about which patients receive intensive care.

What is different from general ICU's?

1. Specialized Expertise

- Oncology ICUs are staffed by teams with specialized training in both critical care and oncology. This dual expertise enables better management of cancer-specific complications and acute organ dysfunctions, leading to improved patient care.

2. Tailored Protocols and Guidelines

- Dedicated oncology ICUs can develop and implement protocols specifically designed for the management of critically ill cancer patients. These protocols address unique challenges such as febrile neutropenia, tumor lysis syndrome, and complications from chemotherapy, which are less frequently encountered in general ICUs.

3. Multidisciplinary Collaboration

- The presence of oncologists, intensivists, and other specialists in oncology ICUs fosters a collaborative environment. Daily meetings and communication between these professionals enhance decision-making and treatment strategies, which can lead to better resource utilization and lower mortality rates.

4. Early Recognition and Intervention

- Oncology ICUs facilitate timely recognition of complications and early intervention, which are critical in improving outcomes because Onco critical care physicians are basically in a race against time i.e. delay in recognitions cost lives.

5. Enhanced Supportive Care

- Advances in supportive care, including non-invasive ventilation techniques and improved management of organ dysfunctionhave contributed to better survival rates for cancer patients in ICUs. These advancements help mitigate the side effects of aggressive cancer treatments and improve overall patient stability.

6. Focus on Quality of Life

- Oncology ICUs often incorporate palliative care principles, ensuring that decisions about aggressive treatment align with the patient's goals and quality of life considerations. This holistic approach can lead to improved patient satisfaction and outcomes during critical illness.

How far have we come in Onco -critical care?.

Recent advancements in onco-critical care have significantly improved the management and outcomes of critically ill cancer patients in intensive care units (ICUs).

1. Improved Survival Rates

- Over the past decades, the survival rates for cancer patients requiring ICU care have improved. Studies indicate that the prognosis for critically ill oncological patients is now comparable to that of non-oncological patients, with mortality rates below 30% in the ICU and below 40% in hospitals.

2. Less Restrictive Admission Policies

- ICUs have adopted less restrictive admission criteria for cancer patients. This change allows more patients to receive necessary critical care, recognizing that many can benefit from intensive treatment.

3. The use of non-invasive mechanical ventilation and advanced diagnostic techniques for managing acute respiratory failure has become more common.

4. Integration of Palliative Care

- Onco-intensive care physicians are now taking on roles that encompass both aggressive treatment and holistic care.

5. Advances in Cancer Therapy

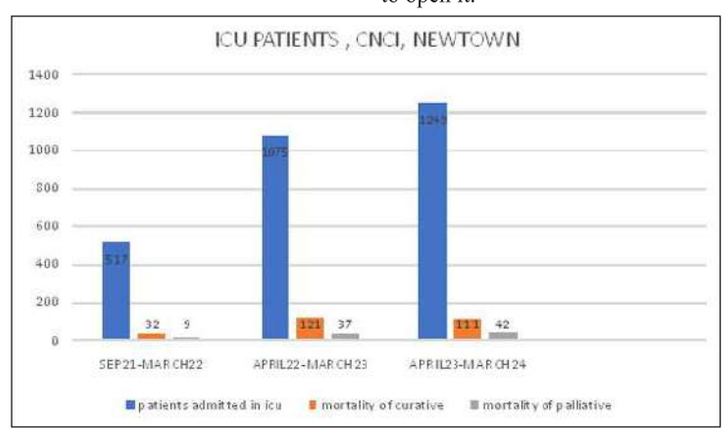
- Innovations in cancer therapies, such as targeted agents, immune checkpoint inhibitors, and chimeric antigen receptor (CAR) T-cell therapy, have transformed treatment protocols. These advancements not only enhance survival but also improve the quality of life for patients, allowing for better management of complications that may arise during critical illness.

We at CNCI

Having a humble start back at 2021 with a 6 bedded Level II ICU, we have progressed exponentially in the last 3 years and presently running two units (MEDICAL ICU & SURGICAL ICU) comprising of 18 beds Level IIIA ICU at our Newtown Campus and it's ever expanding.

We are trying our level best to be at par with the advancements in onco-critical care. By improving admission policies, utilizing innovative therapies, using early warning scores and fostering interdisciplinary collaboration, we are aiming to enhance patient outcomes and quality of life.

The potential of onco-critical care is infinite and as always said "The world is your oyster" and we are just trying to open it.



Evolution of platelets-from haemostasis to cancer….

Aishwarya Guha,
Senior Research Fellow
Immunoregulation and
Immunodiagnostics

A significant percentage of cancer-related mortalities (around 90%) are caused by cancer metastasis, and despite significant advancement in cancer diagnosis, treating metastatic malignancies is still arduous. The dynamic interplay between tumor cells and their surrounding tissues functions as a critical modulator of malignant progression. The metastatic potential of tumor cells continues to evolve outside of the primary tumor site, in response to tumor-host interactions in the bloodstream and at the site of metastasis. The process of metastatic dissemination is initiated when cancer cells within the main tumor acquire the ability to invade distant areas, primarily because of Epithelial Mesenchymal Transition (EMT). This bestows these cells with mesenchymal like migratory and invasive capacities unlike the epithelial cells. Of the several routes of dissemination, blood vessel is the most favoured path of majority of the tumor cells.

Cancer cells, within the blood vessel often referred to as circulating tumor cells (CTCs), are subjected to a variety of stressors, including shear force, immune system attack, and programmed cell death, or anoikis. Seldom do CTCs make it to their ultimate sites, where they attach themselves to the endothelium (often capillaries) and extravasate. The tiny fraction of CTCs that ultimately succeed in overcoming this strenuous process of metastasis and generate the secondary tumors, owe their success to the anucleated cellular fragments within the blood vessels, the 'thrombocytes' or 'platelets'.

Platelets are the cellular orchestrators of primary haemostasis. They have long been known for their role in coagulation and thrombus formation. Bizzozero, in 1882, introduced the term "blood plates" and documented their importance in blood coagulation and in the formation of thrombus. It took an additional hundred years of research in order to demonstrate that platelets have beneficial attributes. They travail as healers, delivering growth factors and other chemicals to aid in the reconstruction of damaged tissue and activate the immune system.

Blood platelets are discoid, anucleated cellular fragments originating from the megakaryocytes. Functionally, they are multifaceted structures with the ability to produce translational proteins, release proteins and metabolites, connect with other cells, and regulate paracrine processes. The glycoproteins (GPs) and integrins that coat the phospholipid-based platelet membrane are necessary for adhesion, activation, and aggregation. They contain an elaborate system of granules in their cytoplasm that contains molecules to regulate various biological processes. Dense (d-) granules contain platelet agonists such as serotonin and adenosine diphosphate (ADP) that serve to amplify platelet activation; alpha (á-) granules contain proteins that enhance the activation process and participate in coagulation while the lysosomal granules contain glycosidases and proteases.

The possible role of platelets in malignancy was reported initially in the 19th century. Gasic et al. (1968) first described the association between platelet number and metastatic cancer potential. Elevated platelet count, which are often as high as 3–4 trillion in an individual cancer patient, has been associated with tumor spread and poor prognosis. Tumor cells can aggregate and activate platelets, leading to the initiation of a thrombus through the process known as tumor cell-induced platelet aggregation (TCIPA). TCIPA is correlated with tumor's propensity to produce thrombosis as well as their capacity for metastasis. Platelet-tumor cell interactions and the signalling pathways have been identified as fundamental determinants of cancer metastasis.

But how do platelets help tumor cells to survive in the blood environment and finally exit the bloodstream? Platelets protect the metastatic tumor cells from immunosurveillance process. One way is that P-Selectin molecule on the surface of activated platelets interacts with PSGL1 expressed by tumor cells. This allows platelets to completely enclose the tumor cells, shielding them from attack by the various immune cells like the NK cells in circulation. Further, as a result of this interaction, platelets become activated by the tumor cells and are termed as 'tumor educated platelets' or 'TEPs'. TEPs differ significantly from normal counterpart producing numerous filopodial processes that facilitates sequestration and protection of the tumor cells. They are a repository of various biologically active molecules that influence tumor progression by modulating EMT, metastasis and angiogenesis.

Several reports have mentioned about the role of TEPs in promoting EMT and metastasis in solid tumors including breast cancer (BC) through cell surface receptor-ligand interactions. However, the status and function of TEPs within the TME has remained under-explored. Our study has found that TEPs are an integral component of the breast TME and interact with breast cancer stem cells (BCSCs) through physical contact to promote disease advancement. Additionally, high percentage of TEPs in the peripheral blood is a potential biomarker and responsible for poor prognosis in BC subtypes. Also, a positive correlation was noted between TEP and CSC frequencies proving their synergistic interactions.

Novel anti-platelet agent aspirin is well established to block platelet activity and impede its procarcinogenic effect. This is in line with our results, where aspirin reduced the activation of TEPs in BC subtypes. Additionally, aspirin treated TEPs were capable of reducing stemness and MDR phenotype of BCSCs. At the same time, they were less migratory and invasive. Thus, our study discloses the importance of tiny anucleated platelets in disease progression and aggressiveness. Their relevance as therapeutic targets is supported by their capacity to interact with the vicious CSCs to produce extremely aggressive sub-variants that are highly metastastic. Besides, their significance in fostering disease aggression, which is supported by the fact that they interact with TNBC (most aggressive BC subtype) to a larger extent than luminal A (less aggressive BC subtype). Overall, the study acknowledges the critical role of platelets in malignancy. Their alliance with vicious CSCs to promote disease advancement acquiesce them as a novel restorative agent.

Leading the Charge against Cancer: Ground-breaking Research and Treatment Solutions

Ayan Majumder,

Senior Administrative Officer

Every Institute has its unique face of identity through which it is known in its domain. . Starting from a point of receiving a patient at registration desk up to giving him/ her proper treatment with precision needs a robust management system which CNCI possesses. On the other hand enrolling researchers with scientific aspirations and constantly nourishing them to reach their desired goals need courage with care and affection. And CNCI has its enough potential in this domain where a Scientist takes personal care to fulfil the needs of a researcher to achieve his/her desired goal.

And here lies its uniqueness.CNCI is a place where cutting edge Sciences blends with different branches of Social Sciences which tells us that you need to come out of your bookish knowledge and apply them with soft skills, a domain of social science. Here at CNCI, you need to have courage to face the grim faces of patients, with your smile and affection so that patient may get strength to combat against all odds. Your voice, your body language, your personality should speak in a way so that a person lying in a bed or sitting in a wheel chair not only gets cutting edge treatment but too get strength enough to subsume his/ her pain.These are the challenges on the part of all stakeholders be a clinician or a nursing personnel or a scientists or a student of management, like myself.All it says about organisational behaviour of an Institute which has its primary goal of patient care management.

An organisation does not have its tangible bodily structure rather it has its several human resources through which it behaves with its stockholders. Here lies the challenge between two poles. One is in giving end and other is in receiving end. A minuscule diversion from giving end may lead to a tangible chaos within the system. From the side of organisation everybody should understand the pain and grief of a patient and address him/ her with empathy may it be a repetitive question or an out of the box one. A security guard or a receptionist at receiving end must realise his/ her doable proposition to address an entity with care and sympathy. Because they are the frontline of an organisation where an entity steps first. In administration where a patient or a research student often comes whenever they face any difficulties to carry forward their desired task. It is the duty of all concerned to address the issue at the earliest with compassion be it for a railway pass or for a fellowship matter. This is not a game to be played by an individual, this is a Team game where each and every person should take the challenge of contributing his/ her level best to touch the needful.

Speech and Swallow Therapy during Cancer Treatment

Amit Shaw

Speech and Swallow Therapist
CNCI

According to the GLOBOCAN 2020 data sheet, oral cavity cancer is the second most prevalent cancer in India and among common malignancies worldwide, accounting for around 10% of all cancers. One of the most prevalent sub sites is the tongue. The recommended course of treatment for oral tongue squamous cell carcinoma (OTSCC) is surgery. Depending on the severity of the condition, surgical resections of tongue tumours might involve anything from a partial tongue resection to a total glossectomy. To maximise the mobility of the remaining tongue and restore the soft tissue bulk, the ensuing tongue defects are rebuilt predominantly or with pedicle or free flaps. Depending on the histopathology results, these individuals may undergo chemo radiation or adjuvant radiation after surgery. Aggressive care like this enhances oncological results, but it has a major negative effect on speech, swallowing, and general quality of life for patients. Oral hygiene, producing understandable speech, and the efficient oral phase of swallowing all depend on the tongue's volume and movement being sufficient. Therefore, balancing the functional objectives with upholding oncological safety presents a challenging task for oncologists.Completing the baseline assessment of the patient's swallowing and speech by the SLP is crucial. In a pre-treatment speech assessment, the patient's communication needs and goals are usually discussed, along with a brief clinical evaluation of the articulators' current function and voice quality (e.g., currently employed and anxious about re-establishing good communication skills versus retired and expressing little concern regarding a decline in articulatory precision) as it comes to swallowing, a clinical swallow examination is usually carried out, and an instrumental assessment (such as the VFSS) is carried out as necessary, especially if the patient is having trouble swallowing.There are various obstacles when reporting swallowing results after glossectomy. Finding significant, broadly applicable findings has been challenging due to inconsistent follow-up periods, low advanced tumour survival rates, and a dearth of large-scale data from a single institution. In addition, the various instruments and measures employed in various research to evaluate these swallowing results have added to the complexity of the issue. The Functional Oral Intake Scale (FOIS), the Performance Status Scale in Head and Neck Cancer (PSSHNC), the 100 ml Water Swallow Test.An oromotor examination is part of the clinical swallow evaluation, which measures the vocal tract's range of motion, strength, precision, and coordination. It also evaluates the structural and muscular movements of the lips, tongue, velum, larynx, jaw, and respiratory muscles for speech and no speech tasks' precision (both individually and repeatedly quickly) (Husaini et al., in press). The assessment offers details on tongue function for swallowing, an estimate of laryngeal motion during the swallow, and the overall timing of the oropharyngeal swallow (i.e., oropharyngeal transit time) (Logemann, 1998). An indicator of decreased lingual strength and/or control, as well as the position and amount of oral residue, can be found during intraoral inspection. If aspiration is evident through coughing, throat clearing, or a wet, gurgly voice quality, clinical evaluation also enables the possible identification of aspiration (Logemann, 1998; Logemann, Veis, &Colangelo, 1999). Aspiration, however, can be silent and undetectable, necessitating an instrumental examination (Lundy et al., 1997; Smith et al., 1999).

VFSS(Video Fluoroscopic Swallowing Study) is used as a gold standard for assessment of swallowing difficulties, it assess the biomechanism of swallowing physiology starting from oral phase to oesophageal stage. PAS (penetration-aspiration scale), Residue scale is used subsequently to understand the movement of bolus, safety of the airway and the leftover bolus which interrupts the normal deglutition.

Ocular Malignant Non-Teratoid Medulloepithelioma: Case report, Discussion & The Masquerades

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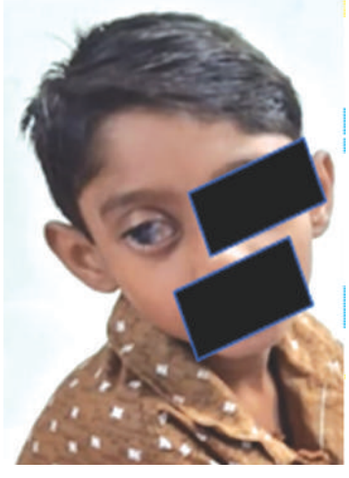
Introduction

Malignant medulloepithelioma of the eye is a extremely rare embryonal tumor with neuroepithelial origin. These tumors typically develop in the epithelium of the ciliary body, and less frequently in the iris, retina, or optic nerve. Initially referred to as "teratoneuroma" and "diktyoma," the term "medulloepithelioma" was established by Grinker in 1931. They generally manifest as unilateral tumors and show no specific preference for sex, race, or laterality.



CASE REPORT

We report a rare case of amelanotic malignant non-teratoid medulloepithelioma in a 7 year oldchild, presented at 6 months of age with epiphora and redness of eye. Congenital cataract and glaucoma were suspected. Since then he had irregular visits to ophthalmologist with no clinical improvement. At 6 years of age ,he was evaluated at Shankar Nethralaya, Chennai, an increased volume of the right eyeball , conjunctival growth located in the nasal sector that protrudes from the palpebral cleft associated with a decrease in visual acuity of the right eye. MRI of Brain & Orbit showed Enlarged right globe, lobulated lesion measuring 17.8 x 9.8 mm in the inferior quadrant of the right eye around the ciliary body, possibility of retinoblastoma is more likely, no significant abnormality noted in brain parenchyma. Enucleation was performed and a biopsy was performed. HPE S/O Malignant Non-teratoid Medulloepithelioma arising from ciliary epithelium, with extension into iris, ciliary body & corneal stroma. There is extensive involvement of scleral fibres, choroid and vitreous with no extension into the optic nerve. IHC shows, strong positivity for PAX 8 and focally positive synaptophysin, INI 1 is retained. Biopsy was reviewed once the child came to our centre and Vincristine, Carboplatin and Etoposide based adjuvant chemotherapy planned for total 6 cycles after staging work up and investigated for DICER 1 mutaion associations.

Discussion

It's a congenitalintraocular tumor, with fewer than 200 cases reported. Occurs most frequently inchildren under 5 years.Clinical signs are varied andnon-specific, leading to delayed diagnosis. This tumor masquerades as other intraocular conditionssuch as cataract and glaucoma.

Medulloepithelioma of the ciliarybody usually presents in early childhood with leukocoria and a mass arising from the ciliary body. Cataracts,ectopia, secondary angle closure, neovascular glaucoma,uveitis, uveal ectropion or vitreous hemorrhage can occur,long before a ciliary body mass becomes clinically apparent Medulloepitheliomas are mostly amelanotic. Unlike Medulloepithelioma of the CNS,the ocular counterpartusually has a benign course.Distant metastases are rare. There have been a few reported cases of metastases to lymph nodes, lungs and parotid glands.

WHO classified this tumour as teratoid(30–50%) and non-teratoid (50–70%). Both can be, malignant and non-malignant. Malignant medulloepithelioma can be distinguished from benign forms on HPE based on, a) Homer–Wright or Flexner–Wintersteiner rosettes as seen in retinoblastoma, b)extraocular or local invasion into surrounding structures such as the cornea, choroid, sclera or optic nerve and c) a high mitotic rate.

HPE& IHC areessential to confirm the diagnosis. Histologically, medulloepithelioma is composed of neuroepithelial cells arranged in cords and tubules, in a net-like appearance (diktyomatous pattern).They may contain cells with a rosette-like arrangement, resembling retinoblastoma. The presence of heteroplasmic elements differentiates teratoidfrom non-teratoid variety. The tumor cells are generally diffusely immunoreactive to vimentin, neuron specific enolase and CD 138. The medulloepithelioma cells were focally positive to cytokeratin (AE1/AE3), cytokeratin 18, CD56,CD57, S100, HMB-45 and bcl2 while areas of retino blastic differentiation showed diffuse immunoreactivity to synaptophysin, neurofilament and CD138 with focal immunoreactivity to calretinin.

The literature reports the possibility of presenting DICER1 gene mutation. Tumorswith this mutation include pleuropulmonary blastoma, cystic nephroma, ovarian Sertoli–Leydigcell tumor, and thyroid hyperplasia or goiter, medulloblastoma, RMS ,colon cancer, PNET, thyroidcancerand Wilms' tumor arealso known associations.

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Although no treatment modality is considered standard,tumors located in the eyeball have an excellent prognosis with a 5-year survival of 90% to 95% after enucleation and delayed diagnosis might contribute to malignant features, necessitating adjuvant chemotherapy after enucleation.

The main predictor of prognosis is extraocular extension.

Adjuvant chemotherapy appears to be effective in preventing recurrence and metastasis of advanced ocular medulloepithelioma. A regime of vincristine, carboplatin and etoposide (VEC)appears to be a safe regimen in the treatment of this condition. The rationale for the choice of VEC is in part related to their success in treating medulloepithelioma elsewhere in the body.

The standard doses of systemic chemotherapy used for children over the age of 1 years old and > 10 kg in weight comprised 1.5 mg/m2 of vincristine, 600 mg/m2 of carboplatin and 300 mg/m2 of etoposide for total 4-6 cycles.

Conclusion

The diagnosis is often confused with other pathologies of orbital or embryonic origin. The differentials of medulloepithelioma should be considered when a child presents with congenital cataract, glaucoma or severe chronic uveitis

India's BioE3 policy push: What to expect for Cancer Research & Bioeconomy through Biotechnolog -Driven Growth

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The Union Cabinet recently approved the BIOE3 (Biotechnology for Economy, Environment, and Employment) Policy, focusing on innovation-driven R&D and entrepreneurship across six sectors: bio-based chemicals, biopolymers and enzymes, smart proteins and functional foods, precision biotherapeutics, climate-resilient agriculture, carbon capture, and marine and space research. Targeting a US$300 billion bioeconomy by 2030, this policy builds on India's bioeconomy growth from US$10 billion in 2014 to over US$130 billion in 2024. Emphasizing biomanufacturing and bio-based systems, it aligns with national 'Net Zero' carbon goals and promotes sustainable growth through a circular bioeconomy, particularly in tier-II and tier-III cities. DBT and BIRAC will focus on high-priority products like drugs and intermediates with commercial potential. However, scaling biomanufacturing from lab to commercial production remains a challenge, requiring collaboration among government, industry, and research institutions to tackle technology adoption, regulatory barriers, infrastructure needs, and workforce development.

Cancer, expected to affect one in two people globally, remains the second leading cause of death, with societal costs projected to exceed $25 trillion from 2020 to 2050. Advanced diagnostic and treatment technologies are critical, particularly in low- and middle-income countries (LMICs) like India, where patent and financial barriers need addressing. Cancer research not only saves lives but also drives economic growth. In the US, every million dollars spent on cancer research generates $28 million in value over 50 years, and in the UK, each pound invested returns £0.40 per year. In 2020/21, £1.8 billion invested in cancer research produced over £5 billion in economic impact, including £3.6 billion in gross value added (GVA) from 47,000 jobs and £1.4 billion in health benefits. Cancer Research UK (CRUK) alone generated £973 million in economic benefits, supporting 9,000 jobs. With cancer cases expected to rise by 40% by 2040, continued investment is crucial for addressing this growing challenge and promoting green growth.

Technological advancements, particularly in DNA sequencing, have fuelled the bio economy. Innovations like CAR T-cell therapy for blood cancers, CRISPR gene editing, and non-invasive liquid biopsies are revolutionizing cancer treatment. CAR T-cell therapy is moving toward off-the-shelf allogenic T-cells, and efforts are underway to apply cell therapy to solid tumors. Antibody-based therapies, targeting immune checkpoints like PD-1, have improved cancer treatment precision, contributing to a doubling of FDA approvals for new molecular entities since 2010. Oncology is now a major driver in this surge, with the market projected to reach $375 billion globally by 2027.

While high-income countries have made significant strides in cancer research, LMICs like India face challenges in achieving similar progress. Collaboration among governments, policymakers, industries, and local research organizations is crucial to developing regionally relevant solutions and ensuring equitable access to biotechnology and cancer research benefits. Over the next decade, cancer research in LMICs should focus on addressing local health challenges, such as late-stage diagnosis, access to affordable treatment, and primary prevention. Implementing cost-effective, innovative treatments and improving health systems through research will be key to closing the gap between evidence and practice, allowing LMICs to influence global cancer care practices.

Optimal Care for Ventilated Patients: A Comprehensive Guide

Sangita Dey,
Staff Nurse

There are various reasons a patient would be put on a ventilator. In some cases ventilator care is short term. In others, long term ventilation is required.Patient require extra care when they are on ventilator. Nurses have a crucial role in taking care of them. We are here to talk about the essentials for ventilator care patients.

- **Medium of ventilation**

Mechanical ventilation can be provided through inserting endotracheal tube and through tracheostomy. Here the nurses have a decisive role in assisting during intubation and also in checking the functioning of tracheostomy.

- **Ventilator setting**

Checking the setting of the ventilator is as important as checking the patient's vitals. A ventilator have the following modes- controlled mechanical ventilation (CMV), assist - control ventilation (ACV), synchronized intermittent mandatory ventilation (SIMV), pressure support, CPAP, BIPAP, Pressure- regulated volume control (PRVC), airway pressure release ventilation (APRV) and Biphasic adaptive support ventilation (ASV), volume support, High- frequency ventilation (HFV).

Nurses need to be aware of the respiratory rate, the tidal volume, the fraction of inspired oxygen and the peak Inspiratory pressure, EtCO2.

Nurses also should have knowledge about different alarms of ventilator and manage them accordingly.

- **Airway management**

Patient's mouth and the tube should be free from any obstruction. It is helpful to check patient's mouth thrice per day to perform oral care with chlorohexidine. In case of tracheostomy proper tracheostomy care should be given daily.

Nurses need to be aware of proper cuff inflation. Too high inflation cause damage but too low can result in the patient not getting as much oxygen as they need. Management of inflation pressure is necessary.

- **Administer suction**

Proper suctioning is beneficial. An endotracheal tube with a suction lumen will remove any secretions that travel from the trachea to the subglottic area. In case of tracheostomy, inner cannula need to be changed and cleaned after each suctioning to prevent blocking. Nurses need to be aware of the alarms given by ventilator that indicate requirement of suctioning i.e. high respiratory rate, high peak pressure, coughing.

- **Infection prevention**

Infection is a real possibility for ventilator patients. Ventilator associated event (VAE) is a common risk. There are a few things that nurses can do to prevent it.

1)Nurses need to be aware of insertion is asepsis. ET tube culture or tracheostomy culture can be send.

2)Oral care need to be performed thrice a day and whenever necessary.

3)Bed elevation up to 30-450is essential to reduce aspiration and it also decrease the risk of developing ventilator associated pneumonia.

4)Peptic ulcer prophylaxis need to be maintained.

5)If possible, brief breaks from sedation in every day is required to assess whether or not the patient is able to be weaned off their ventilator.

- **Fulfilment of nutritional needs**

Patients on ventilator still have to meet nutritional needs. Proper calorie requirement need to be assessed by dietician. It will help prevent infection and aid in their recovery.

Nasogastric tube need to be inserted to fulfil calorie requirement and daily electrolytes monitoring is required.

- **Patient and family education**

Family members need to be council properly about the outcome of ventilator patients, the probable complications and planning of care. Proper ventilator care requires teamwork, frequent re-assessment of patient's need and a lot of attention.

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Published by **SANMOY CHAKRABORTY** On behalf on **CNCI**, Designed & Printed, by Mistry Company,
Regent Estate, Kolkata - 700 092, Ph.: 033 3572 2407, 9830211292. Price: Rs.1/-