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EDITORIAL BOARD

The Crucial Role of Subspeciality Divisions in Advancing Surgical Oncology: A Comprehensive Analysis and Experience at State Cancer Institute

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Introduction

Surgical oncology stands at the forefront of cancer treatment, offering patients hope through surgical interventions aimed at eradicating or controlling malignancies. In recent years, the field has witnessed a paradigm shift with the emergence of subspeciality divisions, focusing on specific types of cancer or surgical techniques. This comprehensive analysis delves into the multifaceted importance of subspeciality divisions in surgical oncology, examining their impact on patient care, research, education and the future of cancer treatment.

Understanding Subspeciality Divisions in Surgical Oncology

Subspeciality divisions in surgical oncology represent a strategic organizational structure within healthcare systems, comprising teams of surgeons dedicated to the treatment of specific types of cancer or specialized surgical techniques. These divisions are characterized by their focused expertise, precision, and multidisciplinary collaboration, all aimed at optimizing patient outcomes and advancing the field of oncology.

1. Precision Medicine and Personalized Care

One of the primary benefits of subspeciality divisions in surgical oncology is their contribution to precision medicine. By concentrating on specific types of cancer, such as breast, gastrointestinal, or head and neck cancers, these divisions enable a tailored approach to patient care. Surgeons within these divisions develop a profound understanding of the unique characteristics of each cancer subtype, allowing for personalized treatment strategies that consider factors such as tumor biology, genetic mutations, and patient preferences.

2. Expertise and Excellence

Subspeciality divisions cultivate a cadre of surgeons with unparalleled expertise in their respective fields. These specialists devote their careers to mastering the intricacies of particular cancers, staying abreast of the latest advancements, and honing specialized surgical techniques. As a result, patients benefit from the collective experience and proficiency of surgeons who are deeply immersed in the nuances of their specific area of focus.

3. Multidisciplinary Collaboration

While subspeciality divisions emphasize a targeted approach to surgical oncology, they also foster multidisciplinary collaboration. Surgeons within these divisions work closely with medical oncologists, radiation oncologists, pathologists, radiologists, and other specialists to develop comprehensive treatment plans that address the diverse needs of each patient. This collaborative model ensures that patients receive integrated care that optimizes outcomes and minimizes the risk of recurrence.

4. Advancing Research and Innovation

Subspeciality divisions serve as catalysts for research and innovation in surgical oncology. Surgeons within these divisions are uniquely positioned to identify areas for improvement and innovation within their respective fields. Through participation in clinical trials, translational research, and collaboration with basic science researchers, these specialists drive advancements in surgical techniques, perioperative care and adjuvant therapies, ultimately enhancing the standard of care for patients with cancer.

5. Education and Training

Subspeciality divisions play a pivotal role in training the next generation of surgical oncologists. Fellows and residents have the opportunity to learn from experts in their chosen field, gaining hands-on experience and exposure to cutting-edge techniques. This structured training environment ensures that

future surgeons are equipped with the skills and knowledge needed to provide exceptional care to patients with cancer, thus perpetuating the cycle of excellence in surgical oncology.

To illustrate the impact of subspeciality divisions in surgical oncology, several case studies and examples can be explored. These may include

- The establishment of a breast cancer subspeciality division within a comprehensive cancer center, leading to improved outcomes for patients undergoing mastectomy or breast-conserving surgery.
- The development of specialized techniques for minimally invasive surgery in gastrointestinal cancers, resulting in reduced morbidity and faster recovery times for patients.
- Collaboration between surgical oncologists and genetic counselors to incorporate genetic testing and counseling into the care of patients with hereditary cancer syndromes, such as BRCA mutations.

Our Experience at a State Cancer Institute

At GCRI we started subspeciality services in year 2016. It was very difficult step to take initially because clinicians were very much reluctant to practice only one specific surgical subspeciality. But because of strong administrative will to start subspeciality services in Surgical oncology it could be possible. There were small initial hiccups but gradually everyone accepted and enjoyed it. I have witnessed both sides of fences and felt a great difference in overall quality of work and approach of clinician while practicing general surgical oncology and working in a sub specialty domain. For the surgical oncology trainees, it becomes very easy to learn the complex surgical procedures from experienced faculties. Their learning curve shortens and complication rates decreases significantly. Because of subspeciality services it becomes easy to witness variety of surgical procedures. Another important aspect from subspeciality division is that surgical oncology trainees find it easy to opt future working area of interest once they have observed all sub divisions very closely.

Challenges and Future Directions

Despite their numerous benefits, subspeciality divisions in surgical oncology also face challenges. It is easy to start subspeciality divisions at places where adequate trained faculties are available but very challenging in certain situations. These may include limited resources, disparities in access to specialized care, and the need for ongoing training and education to keep pace with rapidly evolving advancements in the field. Moving forward, efforts to address these challenges must be prioritized to ensure equitable access to high-quality cancer care for all patients.

Conclusion

In conclusion, subspeciality divisions in surgical oncology represent a transformative approach to cancer treatment, with far-reaching implications for patient care, research, education and innovation. By fostering precision, expertise, collaboration, research and training, these divisions elevate the standard of care for patients with cancer and drive advancements in the field of oncology. As the landscape of cancer treatment continues to evolve, the importance of subspeciality divisions in surgical oncology will only continue to grow, shaping the future of cancer care for generations to come.

Shri Ramniklal J. Kinarivala Cancer Research Award - 2024

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Translational Research to Transformative Medicine

Treatment of solid and liquid malignancies has constantly been challenging because resistance develops and disease reoccurs or transforms to more aggressive form. This information underscores a need for continuous translational research for patients with cancer. At MD Anderson Cancer Center, our motto is 'Research-driven patient care'; and this research is clinical or translational research.

Throughout my career at MD Anderson Cancer Center, I have focused on translational research especially in hematological malignancies. The major objective of my research program is to improve the therapeutic activity of anticancer drugs by understanding their metabolism, mechanisms of action and interactions in combinations. This approach provides the basic scientific knowledge about these compounds and furnishes important information in the design of new clinical protocols. Below I provide three examples where research in my group resulted in changing clinical practice for treatment of different leukemias.

First example:
Biochemical modulation of cytarabine for patients with acute myelogenous leukemia (AML):
Cytarabine or ara-C, a nucleoside analog, is the most effective agent for treatment of AML. This drug is metabolized to its triphosphate; ara-CTP (cytotoxic metabolite) and for this conversion, the rate-limiting step is catalyzed by enzyme deoxycytidine kinase (dCK). Activity of dCK is feed-back inhibited by deoxycytidine triphosphate or dCTP. Fludarabine, another nucleoside analog, also gets accumulated as triphosphate. Fludarabine triphosphate inhibits ribonucleotide reductase resulting in lowering of deoxynucleotide pools including dCTP. We hypothesized, that fludarabine incubations prior to cytarabine will result in increased ara-CTP and better clinical responses. We tested and validated this hypothesis in cell lines and primary leukemia cells. Based on our in vitro data in cell lines and ex vivo studies in primary cells, in collaboration with Dr. Elihu Estey in the Leukemia Department, clinical trials were designed with a pharmacologically guided sequential combination of fludarabine and ara-C for patients with relapsed acute and chronic leukemias. The pharmacokinetic and pharmacodynamic endpoints studied during therapy provided knowledge for optimal schedule, drug dosage and duration of infusions for this regimen. The biochemical and clinical success of this trial in relapsed acute leukemia (AML) resulted in moving this regimen to treat patients with de novo AML. This strategy has been employed nationally and internationally. Still, today; fludarabine and cytarabine couplet has remained backbone of AML therapy especially for core-binding factor AML.

Second example:
Identification of Nelarabine for T-cell Acute lymphoblastic leukemia (T-ALL) & lymphoma (T-LBL):
Clinical observation in pediatric patients demonstrated that children with purine nucleoside phosphorylase deficiency leads to T-lymphopenia. Laboratory studies identified accumulation of deoxyguanosine triphosphate specifically in T-cells leading to T-cell death. This resulted in synthesis of deoxyguanosine analog, arabinosylguanine, ara-G. Nelarabine, 2-amino-6-methoxy-arabinosyl guanine, is more soluble prodrug that gets converted to ara-G. My laboratory investigated actions of G-analogs, such as arabinosylguanine and nelarabine (GW506U78). Our Phase I investigations in collaboration with Dr. Keating established this agent as a future drug for relapsed/refractory T-ALL. Cellular pharmacokinetic investigations in circulating leukemia cells during

therapy demonstrated that the clinical success of the drug was strongly associated with accumulation of analog triphosphate. Using molecular and biochemical approaches, we identified the differences in the actions of ara-G for T and B, and lymphoid versus myeloid diseases. Our laboratory and clinical endpoints established the mechanisms of this specificity. This drug was approved by the U.S. Food and Drug Administration (US-FDA) for T-ALL and T-LBL and was recently tested in phase III randomized trials.

Third example:

Mechanism-based combination of ibrutinib & venetoclax for chronic lymphocytic leukemia (CLL):

B-Cell receptor (BCR) pathway is responsible for production, proliferation, survival and migration of B-cells including chronic lymphocytic leukemia cells, which is a B-cell malignancy. Bruton's tyrosine kinase (BTK) is a pivotal enzyme in BCR signaling. Ibrutinib binds to cysteine 481 residue in the kinase domain of BTK and irreversibly inactivates the protein. Single agent ibrutinib was successful in long-term progression-free survival of patients with CLL but resulted in very limited complete remissions (CR) and undetectable measurable residual disease (uMRD). The clinical success of ibrutinib and its limitations suggested that combination strategies will be needed to achieve deeper and potentially complete remission which may result in uMRD status; a desired clinical endpoint that may translate in cure. Molecular research during clinical trial from my group suggested that the peripheral blood CLL cells after ibrutinib therapy have high levels of Bcl-2 anti-apoptotic proteins while levels of Mcl-1, other congener protein of the same family, are declined. This information provided a strong biochemical rationale to combine ibrutinib with Bcl-2 antagonist, venetoclax. To validate this hypothesis, we performed several in vitro, ex vivo and in vivo mouse model experiments to establish utility of this combination and pharmacological rationale to combine these two agents. Clinically, it was apparent that ibrutinib targets CLL cells resident in lymph nodes while venetoclax irradicates leukemic lymphocytes from peripheral blood and bone marrow providing clinical rationale to combine these two drugs. In collaboration with my clinical colleagues (Dr. Nitin Jain and Dr. Bill Wierda), we initiated a clinical protocol and treated 120 treatment-naive and 80 previously treated high-risk CLL. Early results as well as 3.5-year follow-up studies suggest achievement of complete remission and MRD negativity. This is the first time in CLL we have achieved uMRD with targeted therapeutics. Importantly, both drugs are oral formulation making it convenient outpatient therapy. This combination was then tested in the USA and in a randomized investigation in Europe; it is approved by European Medicines Agency (EMA).

Above three examples serve as epitome of translational research where bench to bedside and back have made transformative changes for patients with leukemias. Considering complexity of cancers, plasticity of cancer cells and their interactions with microenvironment underscore a continuous need for translational research to conquer cancer.

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Shri Madanmohan Ramanlal GCRI Luminary Oration Award - 2024

Dr. Kiran Kothari
MS, DNB, PGDHHM

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Educational Background and Early Career

My journey in medicine began at St. Xavier's School in Ahmedabad, followed by medical education at Baroda Medical College. I completed MBBS in 1978 and went on to earn MS in General Surgery in 1981. My passion for oncology led me to the Gujarat Cancer & Research Institute (GCRI), where I started as a Junior Lecturer in 1982. Over the years at GCRI, I advanced through various roles, including Assistant Professor, Associate Professor, and ultimately, Professor of Surgical Oncology. My career at GCRI spanned 35 years and 5 months, culminating in my role as Deputy Director, where I significantly influenced the institute's clinical and administrative functions.

International Training and Influence

Throughout my career, I always sought to expand my knowledge and skills by obtaining training from some of the most renowned cancer centers globally. My international exposure included visits to the Roswell Park Cancer Center in Buffalo, MD Anderson Cancer Center in Houston, and Memorial Sloan Kettering Cancer Center (MSKCC) in New York, among others. During my tenure at MSKCC, I worked closely with Dr. Jatin P. Shah, a world-renowned head and neck surgeon, which profoundly impacted my approach to surgical oncology.

These international experiences helped me to bring advanced techniques to GCRI, particularly in head and neck oncology. I was an early adopter of the pectoralis major myocutaneous flap for reconstructive surgery in head and neck cancer patients, a technique that was essential for patients presenting with advanced stages of cancer in India.

Pioneering Minimally Invasive Surgery at GCRI

My vision and leadership were instrumental in pioneering minimally invasive surgical techniques at GCRI. In 2003, I established the Department of Minimal Invasive Surgery, reflecting my commitment to adopting new surgical modalities that improve patient outcomes. This department was inaugurated under my leadership and quickly became a center for advanced laparoscopic procedures.

My work in minimally invasive surgery extended to various oncological procedures, including esophagectomies, gastrectomies, and colorectal surgeries. I also emphasized the importance of these techniques in reducing patient recovery times, minimizing surgical trauma, and improving overall survival rates in cancer patients. Ultimately these efforts significantly contributed to the popularization and acceptance of laparoscopy in oncology across India.

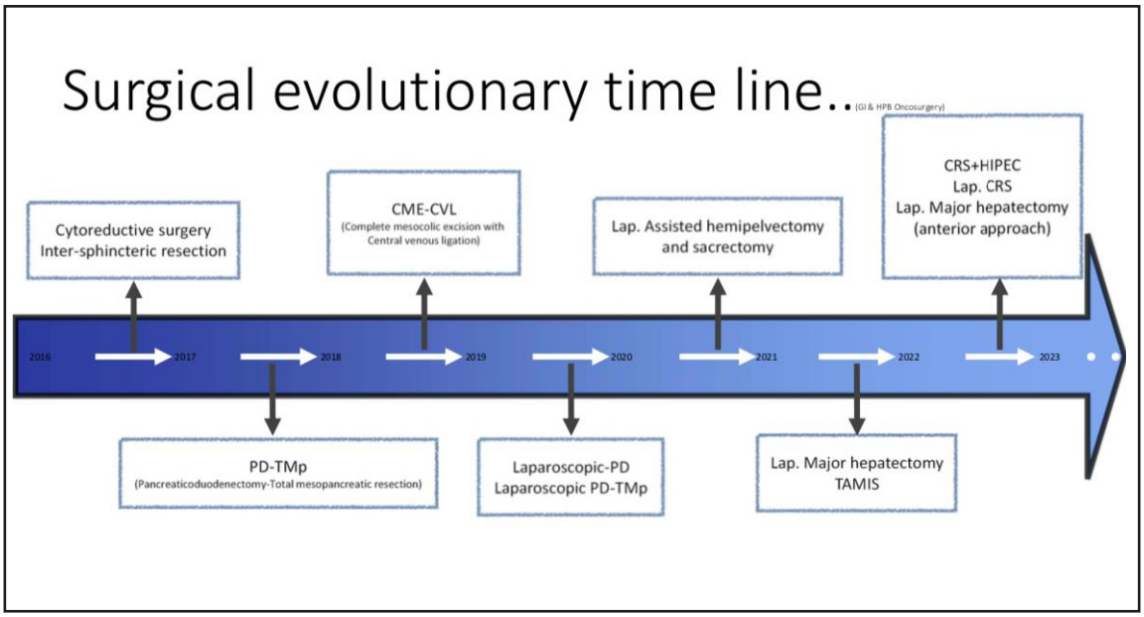
Leadership and Contributions to Medical Education

Apart from being a skilled surgeon, I was also a dedicated educator. I have held numerous leadership positions within professional associations, such as the Indian Association of Surgical Oncology, where I served as President. My involvement in academic activities included serving as an examiner and coordinator for surgical oncology programs at multiple institutions across India, including Tata Memorial Hospital, AIIMS, and other prestigious medical universities.

I also played a crucial role in organizing national and international conferences, workshops, and training programs at GCRI, helping to elevate the institute's status as a leading cancer research and treatment center. My commitment to education extended to my work as a faculty member at various international forums, where I shared my expertise in minimally invasive oncology surgeries.

Contributions to Research and Innovation

I was actively involved in research throughout my career. I participated in and led several clinical trials and research projects at GCRI, focusing on



improving surgical techniques and patient outcomes in oncology. Notable projects included studies on the use of depot progesterone in high-risk breast cancer and trials assessing novel approaches to neck dissections in oral cancer.

My dedication to advancing the field was further demonstrated through involvement in developing and implementing hospital management information systems at GCRI, streamlining administrative processes, and improving patient care services.

Recognition and Legacy

My contributions to oncology have been widely recognized, earning me numerous awards and honors, including life memberships in esteemed medical societies and fellowships from international surgical organizations.

Conclusion

As I reflect on this journey, I credit my mentors, colleagues, and the GCRI community for their support and collaboration throughout my career. I wish my legacy of excellence, compassion and leadership will continue to inspire future generations of oncology professionals, ensuring the impact on cancer care will endure for years to come.

Dr. Shilin N. Shukla Medical Oncology Oration Award - 2024

Dr. Chirag Desai
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The Progress in Oncology Along with My Journey Over Three Decades

There are path breaking collateral developments in all fields of oncology, including medical oncology. The data for adults aged 15 to 99 years indicate that the median survival time of the cancer patients has been constantly improving since 1990 (Figure 1).

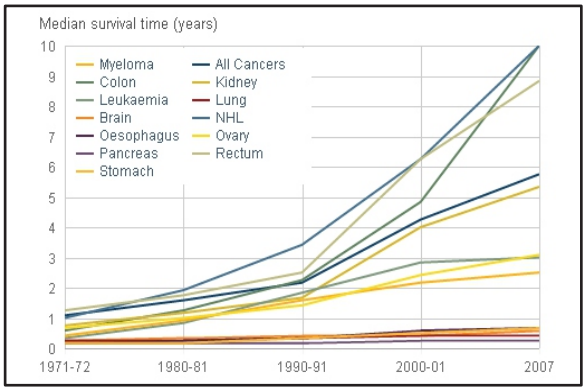

Figure 1: Cancer survival rates in adults aged 15-99 years

The survival rates of the patients with one of the deadliest cancers- Cervical cancer has also been observed to improve based on 11 population based cancer registries (PBCRs) (Figure 2). Such an increase in the overall survival rates of cancer patients since 1990s, was possibly due to development of cancer therapeutic drugs containing new molecular entities (NMEs). Few of the examples include drugs like Cyclophosphamide, Methotrexate, 5 Fluorouracil (5FU), Doxorubicin, Cisplatin, Etoposide, Vincristine/Vinblastine, L-asparaginase, Cytarabine, Procarbazine, Ifosfamide, Mitomycin C, Bleomycin, etc.

The landmark developments in the field of Medical Oncology over last three decades include: fewer cytotoxics, more of TKIs, more of biologicals, immunotherapy, targeted therapies, better imaging and diagnostics, better clinical guidelines, better research methodology, ICH guidelines, better clinical

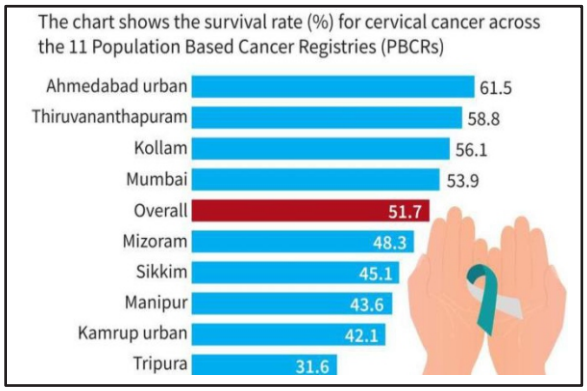

Figure 2: Survival rate (%) for cervical cancer across population based cancer registries

infrastructure, better research infrastructure, better regulatory framework, altogether better science and better translational research leading to better patient outcome.

When I was with GCRI, in early 90s – targeted therapies and MAbs were like fairy tales or SciFi movies. At that time, IACC was renamed to ISMPO during a conference in Ahmedabad, IJKPOC was inaugurated in 1993 and UICC meeting was held in New Delhi. By the end of 90s, Rituximab and Trastuzumab were available and DRL-301 trial was initiated at GCRI. It was my first exposure to clinical trial (sponsored trials) and exposure to Quintiles (now IQVIA). IQVIA is the result of the 2016 merger of Quintiles, a leading global contract research organization, and IMS Health (Intercontinental Marketing Statistics Health), a leading healthcare data and analytics provider. IQVIA is an American multinational company serving the combined industries of health information technology and clinical research. It is a provider of biopharmaceutical development, professional consulting and commercial outsourcing services, focused primarily on Phase I-IV clinical trials and associated laboratory and analytical services, including investment strategy and management consulting services.

With Quintiles, new modalities like monoclonal antibodies (Mabs), Tyrosine kinase inhibitors (TKIs), Photodynamic and many other therapies were established. Temoporfin and Tipifarnib are best examples of this development. Temoporfin is a photosensitizer used in photodynamic therapy for the treatment of squamous cell carcinoma of the head and neck. Tipifarnib is a farnesyltransferase inhibitor. Farnesyltransferase inhibitors block the activity of the farnesyltransferase enzyme which ultimately prevents Ras from binding to the membrane, rendering it inactive. Its efficacy was investigated in patients with HRAS mutant head and neck cancer, peripheral T-cell lymphoma (PTCL), myelodysplastic syndromes (MDS), chronic myelomonocytic leukemia (CMML), certain stages of breast cancer and multiple myeloma.

Later on from 1999 to 2006, many more drugs like Imatinib, Erlotinib, Gefitinib and Bevacizumab were approved and the guidelines for many cancers were also streamlined. The development of Imatinib led to the initiation of the magic bullet – GIPAP (Glivec International Patient Assistance Program) which was a unique direct-to-patient program that provided imatinib (Glivec) at no cost to eligible patients in low- and middle-income countries (LMICs) with chronic myelogenous leukemia (CML) or gastrointestinal stromal tumor (GIST). It changed the treatment landscape of these cancers and opened up the avenues for a new area of research in direction of various TKIs like Dasatinib and Nilotinib that followed imatinib. Since 2002 bevacizumab indications expanded from colon to include lung, breast, ovaries, glioblastoma, renal cell cancer. EGFR- Epithelial Growth Factor Receptor was identified and initial EGFR TKIs were Gefitinib and erlotinib, followed by afatinib and dacomitinib and then Osimertinib. PPARγ agonist efatutazone and gefitinib synergistically inhibit the proliferation of EGFR-TKI-resistant lung adenocarcinoma cells. Clincal trials for new TKIs for Dacomitinib, Nintedanib, Vandetinib for NSCLC and afatinib in breast cancer and head and neck cancer were undertaken. The clinical trial for studying the efficacy and safety of Ambraxane (combination of the chemotherapy drug paclitaxel with a protein called albumin) injection formulation for nanodispersion (PICN) in subjects with metastatic breast cancer patients was commenced. Meanwhile, antiemetics, GCSF/PEG-GCSF and bone targeted therapies were familiarized as supportive care to better manage the post chemotherapy effects like pain and oral mucositis.

Unique efficacy/response pattern was identified for immunotherapies like CTLA 4 Blocker-Ipilimumab. Ipilimumab was the first drug to achieve a significant improvement in survival of advanced stage melanoma. This was soon followed by a large number of PD1/PD-L1 blockers Nivo/Pembro/Durva/Avelumab/Atezolizumab. Moreover, first-line maintenance avelumab immunotherapy in patients with metastatic urothelial carcinoma resulted in significantly longer overall survival than best supportive care alone. Further, many multicentric experimental studies for efficacy of targeted therapies like Palbociclib, Enzalutamide and Eribulin in Indian population are still underway and yet to be published.

Impact of Home-Based Palliative Care Service on Symptom Burden of Patients and to Study the Caregivers' Satisfaction

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Summary

The specialised home-based palliative care services in case of advance cancer is help needed to relieve suffering from pain and other physical symptoms along with mitigation of psycho-social and spiritual issues of patients' and their care-givers. Our aim is to evaluate the effects of home-based palliative care services in terms of reduction in symptom burden of patients and to study reduction in emergency or hospital visit and to know caregivers' satisfaction. Total 350 patients were included in the study as stated in inclusion and exclusion criteria. The Edmonton Symptom Assessment Scale (ESAS) score was utilized to evaluate the patients' symptoms and care-givers' satisfaction was recorded using FAMCARE-2 Scales. We found significant improvement in physical symptoms after home based palliative care and during follow up. We found that more than 70% of the caregivers were satisfied with treatment, information and training regarding home care of patient. Only 75 (21.41%) patients need emergency visit or admission to hospital/hospice. 275 (78.57%) of advanced cancer were satisfactorily treated at home. We found 84% of patients died at home peacefully. So, we can conclude that Specialized home based palliative care can reduce readmissions to hospital by treating physical symptoms at home and increase care givers' satisfaction.

Keywords: Advanced cancer, Specialized home based palliative care, Physical symptoms, Caregiver

Introduction

The main purpose of palliative treatment is to intercept and alleviate suffering from pain and other physical and psycho-social issues and to come up with the finest possible quality of life (QOL) to patients and their care-giver, in spite of the advanced stage of disease.[1] There are different models of palliative service available in India including; inpatient care (in hospices or hospitals), outpatient clinics (in hospitals and other settings), and home care services (run by hospitals, hospices or volunteer networks).[1] The aim to provide specialized home-based palliative care services in case of advance cancer is to relieve suffering from pain and other physical symptoms along with in mitigation of psycho-social and spiritual issues of patients and their care-givers as much as possible.[1]

It is anticipated that incidence of cancer cases will surge to 12.8 per cent in 2025 compared to 2020.[2] It is commonly observed that majority of patients present in the advance stage of the disease. As a consequence, disease becomes incurable and only option left is the palliation.[2]

As we can manage pain and other physical manifestation and provide supports for psycho-social and other issues of patients and care-givers at home, Specialized home based palliative care is advantageous in case of advanced cancer patients. Other added benefits that home based palliative care provides are reduced hospital admission and emergency visit of patients, patients can be managed at home surrounded by their loved ones and also die peacefully with dignity at home.[1] Home based palliative care are well established in developed nations but in India there are few centres which provide specialized home based palliative care to advanced disease patients.[3-6]

As there are fewer centres which provide specialized palliative care in India, few studies or limited data are available regarding specialized home based palliative service and its effectiveness in Indian population. So, we designed this study at state cancer institute to know the effectiveness of specialized palliative treatment service at home to advanced cancer patients in reducing symptom burden and also to know satisfaction of their care-givers.

- Primary aim is to evaluate the effects of home-based palliative care services in terms of reduction in symptom burden of patients.

- Secondary aim is to study reduction in emergency or hospital visit and to know caregivers' satisfaction.

Material and Methods

This was a prospective cross sectional analytic study done from January 2023 to December 2023. Total 350 patients were taken up in our study as stated in inclusion and exclusion criteria.

Inclusion criteria

- Patients living within radius of 40 kilometres from the institute.
- Patients with advance malignancy
- Patients who fall into High Priority according to triage criteria of our department as shown in Table 1
- ECOG ≥3

Exclusion criteria

- Patients able to come to the hospital.
- Patients on curative treatment protocol

Home visit to provide home based palliative care to the selected patients according to inclusion and exclusion criteria were done by home visit team of Palliative Medicine department of our institute. Home visit team includes palliative medicine physician, palliative care nurses, counsellor, social workers etc.

During first visit our team did comprehensive assessment of patients and record symptoms on ESAS (Edmonton Symptoms Assessment Scale). According to patients' condition and symptom burden, treatment was given like pharmacological and non-pharmacological measures for physical symptoms, counselling and nursing care according to patients and care-givers' need. During next follow-up visit again symptom burden assessed by ESAS and care-givers' satisfaction were recorded using FAMCARE-2 Scales.[7] The FAMCARE-2 scale includes 17 components. The components relate to take measurement of satisfaction of the services given by palliative care teams with multidisciplinary focus. Each component has a five-point Likert scale that rate from very dissatisfied, dissatisfied, undecided, satisfied and very satisfied. In addition, the family members could select an additional option, "not relevant to my situation". The scale consists of four dimensions: 1) management of physical symptoms and comfort {five items}; 2) Provision of information {four items}; 3) Family support {four items}; and 4) Patient psychological care {four items}[(7)].

We collected demographic and clinical data like age and gender of patients, diagnosis and ECOG score. We recorded symptoms severity on ESAS scale on every visit and used data of first and second visit to know effectiveness of home based care. FAMCARE-2 scale was noted in follow-up visits. We also recorded number of hospital/emergency department visit of each patient.

Table 1: Triage criteria for home visit priority

Intensity of palliative care needs	Category for Home care visits
One symptom with score ≥ 7 Two symptoms score ≥5	High priority (HP) Every 3 - 7 days
One symptom with score ≥5, Symptoms responding yet not fully controlled after Palliative care intervention	Intermediate priority (IP) Once in 2 - 3 weeks
Adequate symptom control Stable palliative care needs	Low priority (LP) Once in 4 - 6 weeks

Statistical analysis

Continuous variable data were described as mean (X) ± standard deviation (SD), while categorical variable data were described as number (frequency) and percentages (%). Symptom burden on first and second visit was compared and p value (<0.05 is considered as significant) calculated by using t-test. Data of FAMCARE-2 scale were analysed in terms of frequency and percentage. For all this statistical analysis we used socscistatistics.com calculator.

Result

Total 350 patients were incorporated in our study. Mean age was 51 ± 13 years (range 8 to 93). We found that most common cancer was carcinoma of buccal mucosa followed by carcinoma of cervix in our study. Demographic & clinical data is shown in Table 2.

Patients and their families had comprehensive assessments at home. The ESAS score was utilized to evaluate the patients' symptoms. We found pain was the leading disturbing symptom among these patients with mean severity score of 6.3 ± 1.88 on first visit, followed by breathlessness, nausea/vomiting and depression with mean severity score of 4.7 ± 0.67, 5 ± 0.81 and 4.6 ± 1.64, respectively as shown in Table 3. We found significant improvement in severity of symptoms (P value <0.05) in follow up visit after home based palliative care. All these led to improvement in overall wellbeing of patients. There was no significant improvement in fatigue and appetite of patient.

We found that more than 70% of the caregivers satisfied with treatment, information and training regarding home care of patient by the home care services team during home visit as recorded by FAMCARE-2 scale. Description of detail of FAMCARE-2 scale is shown in Table 4.

Table 2: Demographic & Clinical data

Age (Years)(Mean ± SD)	51 ± 13
Gender (n; %)	
Male	202 (57.7%)
Female	148 (42.2%)
Diagnosis (n; %)	
Ca Buccal Mucosa	64 (18.28%)
Ca Cervix	58 (16.57%)
Ca Tongue and Lip	49 (14%)
Ca Breast	38 (10.85%)
Ca Lung	33 (9.4%)
Ca Prostate	25 (7.14%)
Ca Pancreas	23 (6.5%)
Hepatocellular carcinoma	21 (6%)
Bone Malignancy	15 (4.28%)
Ca Gall Bladder	12 (3.4%)
Others	12 (3.4%)
ECOG (n; %)	
0,1,2,	0 (0%)
3	206(58.85%)
4	144 (41.14%)

Table 3: Severity of symptoms according to ESAS

Symptoms	ESAS score (Mean ± SD)		P value
	Visit 1	Visit 2	
Pain	6.3 ± 1.88	2.9 ± 1.19	0.00014
Fatigue	3 ± 0.81	2.7 ± 0.67	0.3823
Nausea / Vomiting	5 ± 0.81	1.3 ± 0.67	0.00001
Depression	4.6 ± 1.64	1.5 ± 0.52	0.00002
Anxiety	3.7 ± 1.41	1.3 ± 0.94	0.00001
Drowsiness	2 ± 0.66	0.9 ± 0.73	0.0025
Breathlessness	4.7 ± 0.67	1.9 ± 0.73	0.00001
Appetite	3.3 ± 0.82	3.1 ± 0.73	0.5743
Sleep	3.2 ± 1.03	2.3 ± 0.82	0.044
Wellbeing	2 ± 0.81	1.2 ± 0.63	0.024

By providing specialized home based palliative care to these patients, only 75(21.41%) patients out of 350 needed emergency visit or admission to hospital/hospice. 275 (78.57%) of advanced cancer were satisfactorily treated at home, by home based palliative care as shown in Table 5.

As shown in Table 5, out of 21.14% patients, 16% of patients died in hospital / hospice that required

Table 4: Data of Caregivers' satisfaction (FAMCARE-2 Scale)[7]

Description	Satisfied; n (%)	Dissatisfied; n (%)	Not relevant to my situation; n (%)
The patients comfort	249 (71.14)	35 (10)	66 (18.85)
The way in which the patient's condition and likely progress have been explained by the Palliative care team	306 (87.42)	19 (5.42)	25 (7.14)
Information given about the side-effects of treatment	274 (78.28)	45 (12.85)	31 (8.85)
The way in which the palliative care tea, respects the patients dignity	244 (69.71)	40 (11.42)	66 (18.85)
Meetings with the palliative care team to discuss the patient's condition and plan of care	324 (92.57)	9 (2.57)	17 (4.85)
Speed with which symptoms are treated	257 (73.42)	29 (8.28)	64 (18.28)
Palliative care team's attention into the patient's description of symptoms	269 (76.85)	22 (6.28)	59 (16.85)
The way in which the patient's physical needs for comfort are met	309 (88.28)	10 (2.85)	31 (8.85)
Availability of the Palliative care team to the family	254 (72.57)	29 (8.28)	67 (19.14)
Emotional support provided to family members by the Palliative care team	294 (84.00)	12 (3.42)	44 (12.58)
The practical assistance provided by the palliative care team (e.g. bathing, home care, respite)	257 (73.42)	27 (7.72)	66 (18.86)
The doctors attention to the patient symptom	307 (87.72)	20 (5.72)	23 (6.58)
The way the family is included in treatment and care decisions	284 (81.15)	16 (4.58)	50 (14.28)
Information given about how to manage the patient symptom (e.g. pain, constipation)	255 (72.85)	46 (13.15)	49 (14.00)
How effectively the palliative care team manages the patient's symptom	302 (86.28)	19 (5.42)	29 (8.28)
The palliative care team's response to changes in patient's care needs	273 (78.00)	18 (5.15)	59 (16.85)
Emotional support provided to the patient by the palliative care team	266 (76.00)	28 (8.00)	56 (16.00)

Table 5: Details of emergency visits or admission to hospital/hospice; Place of death of patient

	Number of patients; n (%)
• Frequency of Emergency visit or admission to hospital / hospice	
None	275 (78.57)
1	47 (13.42)
2	18 (5.14)
More than 2	10 (2.85)
• Place of death of patient	
Home	294 (84.00)
Hospital	37 (10.60)
Hospice	19 (5.40)

admission or emergency visit to healthcare facility. Remaining 84% of patients expired at place of residence peacefully and with dignity.

Discussion

In Palliative care, by identification and early treatment of physical, psychosocial, and spiritual suffering we can improve the quality of life of patients suffering from life limiting illness and also that of their family. Palliative care is very much helpful in advanced cancer patients and their care givers because they are suffering from various physical, psycho-social and spiritual problems arise from disease itself and from its treatments.[8] Among various types of palliative care delivery models, home-based palliative treatment services increased the popularity of palliative care around the world.[8] Except in some areas in India major part of outpatients palliative care is restricted to hospital or clinical settings.[6] As there is great need of home based palliative care around our centre, we started providing home based palliative care for advanced cancer patients residing within radius of 40 kilometres from our institute. We did this observational study to find out its outcome.

We studied 350 patients; demographic data were comparable with other studies. According to Sathishkumar et al in their study of CANCER INCIDENCE ESTIMATES FOR 2022,[2] they found notable sites of cancer among males were lung, mouth, prostate, tongue and estimated predominant sites of cancer among females included breast, cervix and ovary. We found leading site of cancer in our patients was carcinoma of buccal mucosa, cervix, tongue, breast and lungs; which are similar to the above study.

We found significant improvement in physical symptoms like pain, nausea/vomiting, depression, anxiety, breathlessness and sleep during follow up of patients by providing specialist home based palliative care. But there was no significant improvement in fatigue and appetite. One study done by Kerr et al,[9] to see Clinical Impact of a Home-Based Palliative Care Program in New York found Six of eight symptom domains (anxiety, appetite, dyspnea, well-being, depression, and nausea) showed recovery while assessed with ESAS which is similar to our study findings. Robert B et al in their study titled 'Home Based Palliative Care: Known Benefits and Future Directions' also found the most widely described outcome is appropriate and acceptable control of physical and psychosocial symptoms such as pain, constipation, dyspnea, fatigue, anorexia, anxiety, and depression.[10]

By home based specialized palliative care, we can deliver extended support and enhance the skill of family care givers in caring their patients by providing necessary information and training regarding generalised nursing care, stoma care, feeding and medicine administration etc. and also providing psycho-social and spiritual care as needed.[11] Effectiveness of these can be measured by care-givers satisfaction. We did care-givers' satisfaction survey by using FAMCARE-2 scale and found more than 70% of the caregivers satisfied with treatment, information and training regarding home care of patient. Similar findings were found in studies done by Galatsch M et al for 'family care-givers satisfaction with home-based palliative care in Germany' and by Biswas et al titled 'Satisfaction with care provided by home-based palliative care service to the cancer patients in Dhaka City of Bangladesh: A cross-sectional study'.[7,8]

Various studies done in India and abroad found that by providing home-based palliative care to needy patients, we can significantly reduce patients visit to emergency department and admission to hospital in advanced disease and during end of life care.[1,9-11] So we can increase odds of patients dying at home. Patients with advanced disease dying at home exhibit better quality of life, physical comfort, and psychological well-being along with their care-givers than those dying in hospital setups.[9] In our study we found more than 75% patients were satisfactorily treated at home and did not require any hospital visit or admission. Only 21.41% patients needed hospital visits or admission with variable frequency and only 16% deaths had occurred in healthcare facilities. We found 84% of patients died at home peacefully. These findings are similar to the above mentioned studies in various parts of world.

Conclusion

From our study we can conclude that specialized home based palliative care can improve

quality of life, provide support to caregivers, reduce readmissions by treating physical symptoms at home and increase odds of 'death at home' of patients having advanced cancer.

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GATA3 Expression in Triple Negative Breast Cancer

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Summary
Background: GATA3 (GATA-binding protein 3) belongs to the zinc finger transcription factor family. It plays a role in enhancing cellular growth and differentiation across various tissues and cell types. GATA3 is an estrogen receptor (ER) regulated gene, and also present in primary and metastatic breast cancer.
Aim: To evaluate clinical significance of GATA3 expression in triple negative breast cancer patients.
Method: In this study, formalin fixed paraffin embedded tumour tissue from 100 patients with triple negative breast cancer were analysed in the study. GATA3 expression was assessed using immunohistochemistry method and its correlation with clinical and pathological factors, as well as disease status, was examined.
Results: Nuclear GATA3 positivity was seen in 61% of triple negative breast cancer patients. GATA3 expression when correlated with clinicopathological parameters, a significant higher incidence of GATA3 expression was noted in patients with T4 tumor size, lymph node positive status and advanced stage of disease as compared to their respective counter parts. Such a correlation of GATA3 expression was not observed with other clinical and pathological parameters. In univariate survival analysis, GATA3 expression did not discriminate patients with worse or better disease free survival (DFS) and overall survival (OS). In multivariate survival analysis for disease free survival, disease stage entered at step 1 as significant prognostic factor.
Conclusion: A nuclear GATA3 expression correlated with T4 tumor size, lymph node positive status, advanced disease stage suggests a marker of disease aggressiveness for TNBC.
Keywords: Breast cancer, ER, GATA3, Triple Negative Breast Cancer, DFS

Introduction

Triple negative breast cancer (TNBC) is characterized by the lack of estrogen, progesterone and HER-2 receptors. TNBC accounts for 15–20% of all newly diagnosed cases of primary breast carcinoma and has the worst overall prognosis.[1] GATA3 binding protein 3 is a group of six zinc finger transcription factor initially recognized for its role in controlling immune cell activity. It is crucial in regulating the development of various tissue, including blood cells, skin, breast, kidneys and the central nervous system. GATA3 is responsible for maintaining the quiescent state of differentiated luminal cells in the adult mammary gland, therefore it is possibly causally involved in pathogenesis of breast carcinoma.[2] Several earlier studies have demonstrated elevated level of GATA3 in ER-positive (luminal) breast cancers. They found that GATA3 and estrogen receptor (ER) are involved in a cross-regulatory loop and are therefore regularly co-expressed in breast cancers.[3-11] But GATA3 expression in TNBC is particularly significant because this subtype of breast cancer typically tests negative for most markers associated with breast tissue. Due to low sensitivities of mammaglobin and GCDFP15, GATA3 may potentially be a useful marker in TNBC.[12,13] Therefore, this study evaluated clinical significance of GATA3 in TNBC patients and its correlation with clinicopathological parameters and disease status.

Materials and Methods

Patient characteristics

This study was approved by the Institutional Scientific Review and Ethics Committees. In this retrospective study, a total of 100 TNBC patients (ER-/PR-/HER2-) diagnosed and treated at The Gujarat Cancer and Research Institute were enrolled. The detailed clinical history of patients like age, menopausal status, histopathological findings, disease stage and treatment offered was recorded from the Institutional Medical Record Department. The disease was staged using the AJCC classification. Disease status was evaluated through clinical examination, radiological investigations and biochemical investigations.

Immunohistochemical Localization

The tissue blocks were archived from histopathology department. Three µm thin sections were taken on 3-Aminopropyl-triethoxysaline (APES) coated slides. GATA3 staining was performed on Ventana Benchmark autoimmunostainer. For IHC staining Ventana reagents were used. EZ prep solution used for deparaffinization, followed by antigen retrieval using cell conditioning 1 (CC1) buffer for 30min. Ultra view DAB detection kit was used for further IHC steps. 100µl GATA3 antibody

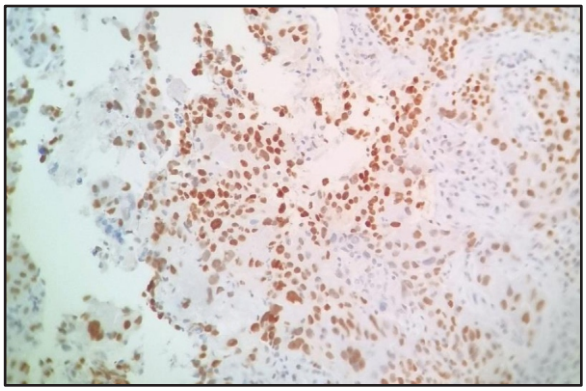

Figure 1: Nuclear GATA3 expression in tumour cells of TNBC patient (40X)

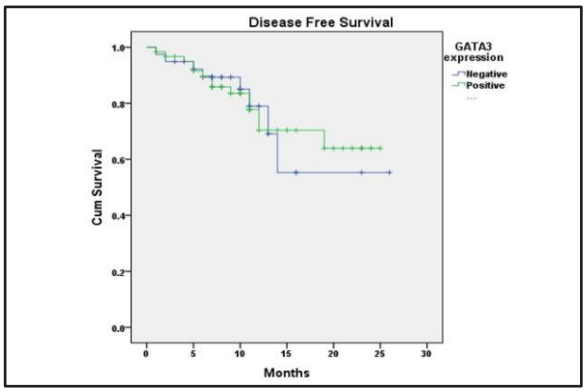

Figure 2: (A) Kaplan - Meier survival analysis for disease free survival (DFS)

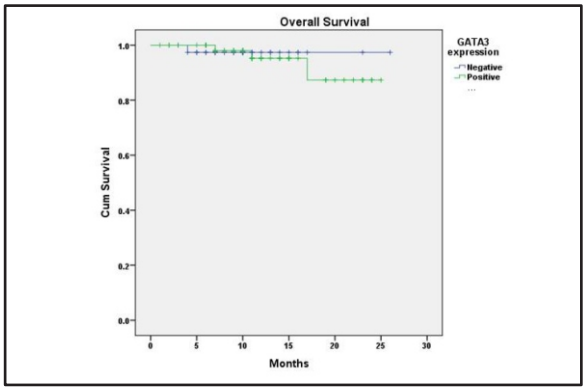

Figure 2: (B) Kaplan - Meier survival analysis for overall survival (OS)

(Clone: L50-823; dilution 1:100) was used from cell marque company. Slides were mounted with DPX and viewed under microscope.

Scoring

For GATA3 evaluation H-score method was used. Nuclear staining pattern was observed for GATA3.

Statistical analysis

Statistical analysis was done by SPSS statistical software version 20. Pearson's Chi-square test with Pearson's correlation coefficient (r) was used to assess correlation and significance between two parameters. Univariate survival analysis, Kaplan Meier and Log Rank tests, was conducted to assess the prognostic impact on disease-free survival (DFS) and overall survival (OS). Multivariate survival analysis was carried out using Cox regression model with forward stepwise (likelihood ratio) approach. P values ≤ 0.05 were considered to be statistically significant.

Results

GATA-3 expression in breast carcinoma

Nuclear GATA3 expression was detected in 61% (61/100) of TNBC patients. Among these patients, 17% showed an H score of +1, 25% had a score of +2, and 19% exhibited a score of +3 staining (Figure 1).

Correlation of GATA3 expression with clinicopathologic parameters

A significant higher incidence of GATA3 expression was noted in patients with T4 tumor size (100%; 04/04; p = 0.04) as compared to patients with T3, T2, and T1 tumor size (79%; 11/14), (58%; 24/41), and (46%; 12/26), respectively. (Table 1). Further, a significant higher incidence of GATA3 was detected in patients with lymph node positive status (76%; 29/38; p = 0.011) than lymph node negative status (49%; 21/43) (Table 1). Similarly, significant higher incidence of GATA3 expression was noted in patients with advanced stage of disease (83%; 20/24; p = 0.011) as compared to patients with early stage of disease (34%; 35/65) (Table 1). Regarding BR Score, a higher incidence of GATA3 expression was found in patients with high BR score (61%; 40/65; p = 0.131) as compared to patients with intermediate BR score (41%; 07/17). While GATA3 expression was not associated with age at diagnosis and menopausal status (Table 1).

Correlation of GATA3 expression with disease status

Based on the univariate survival analysis, conducted by Kaplan-Meier, in relation to DFS, similar rate of disease relapse was observed in patients with GATA3 positivity (23%; 14/61) and GATA3 negative patients (21%, 08/39; Log rank = 0.008, df = 1, p = 0.929) (Table 2, figure 2A). Regarding OS, a similar incidence of death was seen in GATA3 positive patients (05%, 03/61) and GATA3 negative patients (03%, 01/39; Log rank = 0.087, df = 1, p = 0.767) (Table 2, Figure 2B). A multivariate survival analysis was conducted using a Cox regression model with forward stepwise approach to assess the prognostic importance of clinical and pathological

Table 1: Correlation of GATA3 expression with clinicopathological parameters and disease status

Parameters	GATA3 expression			
	N(%)	Negative N(%)	Positive N(%)	P
Age(years)	**100(100)**	**39(39)**	**61(61)**	
≤50 years	53(53)	17(32)	36(68)	0.132
>50 years	47(47)	22(47)	25(53)	
Menopausal Status	**100(100)**	**39(39)**	**61(61)**	
Premenopausal	29(29)	10(35)	19(65)	0.554
Postmenopausal	71(71)	29(41)	42(59)	
Tumor Size	**85(100)**	**34(40)**	**51(60)**	
T1	26(31)	14(54)	12(46)	0.040
T2	41(48)	17(42)	24(58)	
T3	14(16)	03(21)	11(79)	
T4	04(05)	00(00)	04(100)	
Lymph node Status	**81(100)**	**31(38)**	**50(62)**	
Negative	43(53)	22(51)	21(49)	0.011
Positive	38(47)	09(24)	29(76)	
Stage	**89(100)**	**34(38)**	**55(62)**	
Early (Stage + IA + IIA + IIB)	65(73)	30(66)	35(34)	0.011
Advanced (Stage IIIA + IIIB)	24(27)	04(17)	20(83)	
Histopathology	**100(100)**	**39(39)**	**61(61)**	
IDC	99(99)	38(38)	61(62)	0.209
IDC + DCIS	01(01)	01(100)	00(00)	
Histological Grade	**100(100)**	**39(39)**	**61(61)**	
Grade II	19(19)	07(37)	12(63)	0.830
Grade III	81(81)	32(40)	49(60)	
BR Score	**82(100)**	**35(43)**	**47(57)**	
6-7 (Intermediate)	17(21)	10(59)	07(41)	0.131
8-9 (High)	65(79)	25(39)	40(61)	
Disease Metastasis	**100(100)**	**39(39)**	**61(61)**	
Yes	22(22)	08(36)	14(64)	0.774
No	78(78)	31(40)	47(60)	
Disease Status	**100(100)**	**39(39)**	**61(61)**	
Alive	96(96)	38(48)	58(52)	0.558
Dead	04(04)	01(25)	03(75)	

Table 2: Univariate analysis of GATA3 expression

GATA3 expression	N	DFS in months Mean ± SE	Remission N (%)	Relapse N (%)
Negative	39(39)	19.066 ± 2.144	31(79)	08(21)
Positive	61(61)	19.609 ± 1.224	47(77)	14(23)
			Log = 0.008, df = 1, p = 0.929	
GATA3 expression	**N**	**OS in months Mean ± SE**	**Alive N (%)**	**Dead N (%)**
Negative	39(39)	25.421 ± 0.571	38(97)	01(03)
Positive	61(61)	23.620 ± 0.783	58(95)	03(05)
			Log = 0.087, df = 1, p = 0.767	

Table 3: Multivariate analysis of GATA3 expression

							95.0% CI for Exp(B)	
Patients	**Steps**	**Variables**	**Wald Statistics**	**Df**	**P**	**Exp(B)**	**Lower**	**Upper**
DFS	1	Stage	5.640	1	0.018	3.985	1.273	12.475

factors, including age, menopausal status, tumour size, lymph node status, disease stage, histological grade, BR score and GATA3. Disease stage entered at step 1 as significant factor (Wald statistic = 5.650, df = 1, Exp (B) = 3.985, p = 0.018; Table 3).

Discussion

In this retrospective study, we evaluated the expression of GATA3 in TNBC patients and observed nuclear GATA3 expression in 61% of tumor tissues. Similar incidence of GATA3 expression was observed in earlier studies which reported GATA3 expression ranging from 40% to 90% in TNBC patients.[12, 14-19] In this study, GATA3 expression was not correlated with clinical parameters such as age and menopausal status. Significant association was not observed with age and menopausal status which is in concordance with many studies which showed no correlation between the GATA3 expression with age and menopausal status.[19-22]

Regarding pathological parameters, a significant higher incidence of GATA3 expression was noted in T4 tumor size as compared to their counterparts which is in concordance with the study of Lahari Banik et al.[22] Furthermore, with respect to lymph nodes status, GATA3 expression was significantly higher in lymph node positive patients which is similar with the study of Kouros-Mehr et al.[2] This study also represents a significant higher incidence of GATA3 expression with advanced stage of disease as compared to early stage of disease which is supported by the study of Singh et al.[18] While no significant correlation was noted with histopathology subtypes this was similar with the studies of Suri et al.[21] and Albergaria et al.[23] Also, with respect to high grade tumors no significant correlation was observed which is in concordance with the studies of Ahadi et al. [19] and Kim et al. [24]

In present study, a similar incidence of GATA3 expression was noted in patients with disease relapse and patients who undergone disease remission. A significant correlation was not observed between GATA3 expression and disease metastasis which is in concordance with the study of McCleskey et al.[7] Further, significant correlation was not found between DFS and OS in TNBC patients this was supported by the study of Albergaria et al.,[23] and Ciocca et al.[25] In multivariate survival analysis with respect to DFS, disease stage is found to be independent prognostic factor in step 1 among the clinicopathologic parameters analysed in this cohort. Also, multivariate analysis of Mehra et al.[3] revealed that low GATA3 expression was an independent predictor of DFS in prognostic feature.

Conclusion

In summary, nuclear GATA3 protein expression correlated with T4 tumor size, lymph node positive status and advanced disease stage suggests a marker of disease aggressiveness. Further investigation of GATA3 related pathway will help to understand disease metastasis and may also provide novel therapeutic targets in TNBC.

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Radiation: More Than Just a Scary Story

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When someone hears the word "radiation", it often conjures up terrifying images for them. Hiroshima and Nagasaki's atomic bombings and the Chernobyl disaster are burned into our collective consciousness. These events were horrific tragedies and have only served to amplify the association between radiation and disaster.

Our perception of radiation is heavily skewed by the way it's introduced to us throughout life. Consider our school days: history textbooks dedicate significant space to the devastating nuclear attacks of World War II, while science textbooks often give less emphasis to the discovery and applications of radiation. This creates an imbalance in our understanding from the very beginning.

This one-sided portrayal extends beyond education. Even in popular culture, the movie industry bombards us with terrifying scenes of nuclear war, while positive portrayals of radiation's use are far less common. Now, streaming platforms are following suit with documentaries that understandably focus on the human cost of nuclear disasters. While these stories are important, the lack of counter-narratives reinforces the association of radiation solely with destruction.

But, is it an only side of radiation? And the answer is no. Then the question arises what is bright side of radiation?

Radiation has a wide range of beneficial uses, some of which might surprise you! Here are a few areas where radiation plays a positive role

ROLE IN MEDICINE

Radiation has become an indispensable tool across various medical specialties, but especially in oncology. Here, radiation plays a vital role in diagnosing and treating various cancers. Three primary departments within a hospital setting utilize radiation for oncological purposes:

- **Nuclear Medicine:** This department employs radioactive materials, often introduced into the body through injections or ingestions. These radioactive materials target specific organs or tissues, allowing doctors to image and assess their function or identify abnormalities. This information is crucial for cancer diagnosis, staging (determining cancer severity), and monitoring treatment response.
- **Radiation Oncology:** This department focuses on therapeutic radiation, using high-energy beams of radiation to directly target and destroy cancer cells. Radiation therapy can be curative (aiming to eliminate cancer) or palliative (aiming to relieve symptoms and improve quality of life). Radiation oncologists design personalized treatment plans, considering factors like the type and stage of cancer, the patient's overall health, and the desired outcome.
- **Diagnostic Radiology:** While not directly involved in cancer treatment with radiation, this department plays a crucial role in the oncological process. Diagnostic radiology utilizes various imaging techniques, including X-rays, CT scans, and interventional radiology, to visualize internal structures and detect abnormalities suggestive of cancer. This information is essential for initial cancer diagnosis, treatment planning for radiation therapy or other modalities, and monitoring treatment response.

Other applications

Industry:

- **Sterilization:** Food irradiation uses radiation to eliminate harmful bacteria and extend shelf life without affecting taste or quality.
- **Non-destructive Testing:** Radiation helps inspect welds, pipes, and other structures for hidden cracks or flaws, ensuring safety and reliability.

Energy:

- **Nuclear Power:** Nuclear power plants use controlled nuclear reactions to generate electricity, providing a low-carbon energy source.

Other Applications:

- **Archaeology:** Carbon dating, a technique using radiation, helps determine the age of ancient artifacts.
- **Smoke Detectors:** Americium, a radioactive element, is used in some smoke detectors to ionize air and trigger an alarm.

This is just a glimpse into the many ways radiation benefits our lives. Remember, radiation itself isn't inherently good or bad – it depends on the type and amount of radiation exposure. Understanding its diverse applications can help create a more balanced perspective.

Secondary H3K27 Altered Diffuse Midline Glioma in a Treated Case of Acute Lymphoblastic Leukemia: A Case Report

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Summary

H3K27 altered diffuse midline glioma is a distinct grade IV glioma as per the recent 2021 WHO classification of primary CNS tumors. Herein, we report a rare case of a 26-year-old male diagnosed with this after treatment of B cell Acute Lymphoblastic Leukemia (B-ALL) with a latency period of 5 years post cranial radiation therapy (PCI). A 26-year-old male presented to the Medical Oncology Department with complaints of tingling sensation in bilateral upper limb for 15 days. MRI brain with MR Spectroscopy and whole spine screening revealed multiple thick walled cavitary lesions in right posterior capsuloganglionic - thalamus and centrum semiovale region. He had a past history of treatment of Philadelphia negative B-ALL in 2018 at the age of 21 years with MCP 841 protocol. Near total resection (NTR) of brain lesion was done and histopathology revealed this diagnosis. He is planned for adjuvant radiation with temozolomide.

Keywords: H3k27 altered diffuse midline glioma, secondary cranial neoplasm, prophylactic cranial irradiation, acute lymphoblastic leukemia, chemotherapy

Introduction

H3K27 altered diffuse midline glioma is a distinct grade IV glioma as per 2021 World Health Organization (WHO) classification of primary Central Nervous System (CNS) tumors. It is considered as high grade tumor with highly aggressive nature regardless of histological features.[1] A number of risk factors have been described for CNS tumors like exposure to ionizing radiation, a stochastic effect of radiation and certain chemotherapeutic agents.[2] Herein we report a rare case of a 26 year old male diagnosed with H3K27 altered diffuse midline glioma after treatment of B cell Acute Lymphoblastic Leukemia (B-ALL) with a latency period of 5 years post cranial irradiation (PCI).

Case Report

A 26-year-old male presented to the department of Medical Oncology with complaints of tingling sensation in bilateral upper limb for 15 days which was insidious in onset and gradually progressive in nature. Clinical examination was unremarkable for any focal neurological deficit and higher mental functions were normal. He had past history of Philadelphia negative B-ALL in 2018 at the age of 21 years. He was treated with MCP 841 protocol consisting of multiagent chemotherapeutic agents like anthracyclines, antimetabolites, alkylating agents and steroid divided in phases like induction phase 1 and 2 which included PCI, reinduction, consolidation and maintenance. PCI was delivered with conventional 2D technique with a dose of 1800 cGy/10 fractions which was completed in 2018. Maintenance phase comprising 18 months of chemotherapy was completed in 2021 and was kept under observation thereafter.

Magnetic Resonance Imaging (MRI) Brain with MR Spectroscopy (MRS) and whole spine screening was done revealing multiple thick walled cavitary lesions in right posterior capsuloganglionic - thalamus and centrum semiovale region measuring 3.6x3.8x3.7 cm with 2 adjacent small nodular hyperintense lesions in right parietal white matter measuring 1.4x2.4 cm and part of subependymal periventricular region aspect of trigone of right lateral ventricle measuring 1.2x1.4 cm which were hyperintense on T2W, hypointense on T1W and FLAIR (Fluid Attenuated Inversion Recovery) images and MRS showing raised choline peak and reduced N Acetyl Aspartate (NAA) suggestive of glioma (Figure 1). After ruling out leukemic relapse by doing CSF microscopic and biochemical examination, cytology, flow cytometry which were unremarkable, investigations to rule out infective etiology by CSF culture for bacterial, fungal infection and Cartridge-based nucleic acid amplification

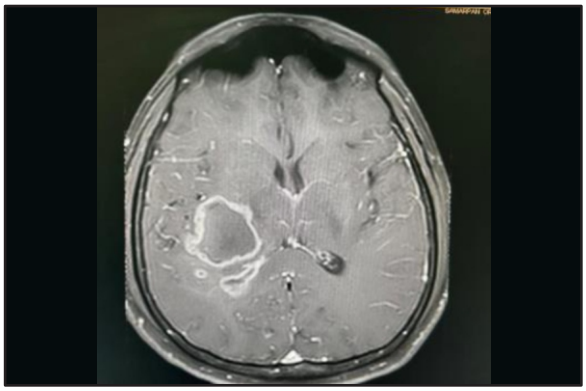

Figure 1: T1W MRI image with contrast enhancing hyperintense lesion

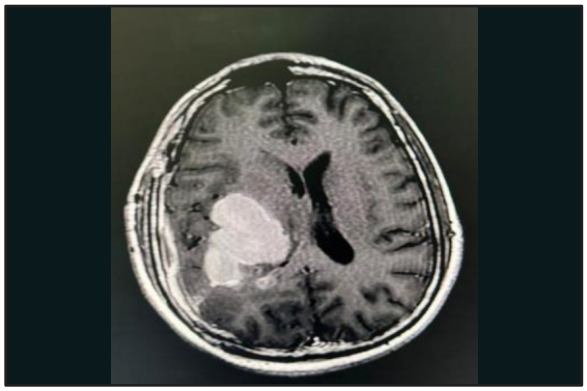

Figure 2: Postoperative T1W MRI with postoperative edema and hemorrhage with nodular residual lesion

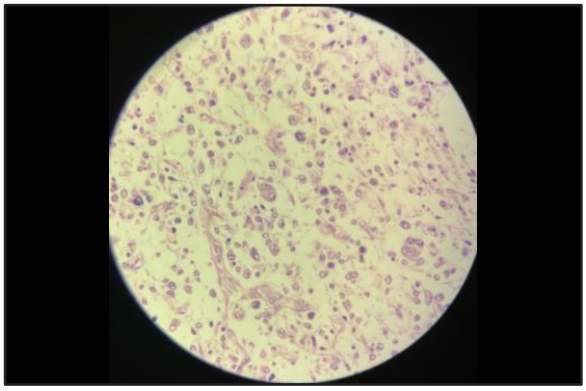

Figure 3: Morphological features of glioma

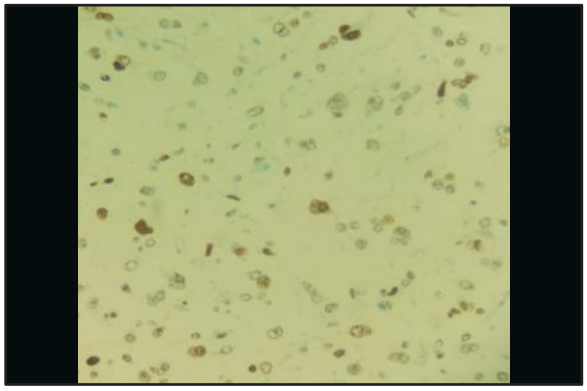

Figure 4: IHC featuring H2K27M alteration

testing (CBNAAT) for tuberculosis were done which were negative. To ensure remission from leukemia, bone marrow aspiration and trephine bone biopsy were done showing marrow in remission and scrotal ultrasound which revealed bilateral normal testis. Neurosurgical consultation was advised for procuring tissue for diagnosis; however patient consulted neurosurgeon elsewhere outside our institute where he underwent near total resection (NTR) of brain lesion through right parieto-temporal craniotomy approach in piecemeal fashion which was sent for histopathological examination. Postoperative clinical examination revealed no neurological deficit. Post-operative MRI brain revealed 2 small nodular residual lesions of 8x10 mm and 6x7 mm with surrounding oedema (Figure 2).

The slides and blocks were reviewed by the oncopathology department of our hospital and the histopathological features were suggestive of diffusely infiltrating tumor cells with marked pleomorphism, increased mitotic activity and endothelial cell proliferation (Figure 3). Immunohistochemical (IHC) markers showed positivity for markers: GFAP, altered H3K27, ki 67 of 10% and negative for CD20, CD3, LCA, CD34, MPO, Tdt and IDH1 R132H (Figure 4) which confirmed the final diagnosis of H3K27 altered Diffuse Midline Glioma, WHO grade 4. Postoperative hematoma was managed conservatively. Patient was thereby referred to the medical oncology department for further care. Patient is planned for adjuvant radiation by Intensity Modulated Radiotherapy (IMRT) at a dose of 180 cGy per fraction to a total dose of 5940 cGy concurrent with temozolomide.

Discussion

Several causative factors are responsible for secondary CNS tumors in ALL patients, including PCI, intrathecal and intravenous chemotherapy, genetic predisposition, and young age at diagnosis. Neoplasms of glial origin predominate, including anaplastic astrocytoma and glioblastoma. Cahan's criteria[3] aid in the diagnosis of radiation induced secondary neoplasms, modified by Schrantz and Araoz[4] as following (1) the tumor must appear within the previously irradiated field, (2) Not present prior to the radiotherapy, (3) a sufficient latency period must have been elapsed between irradiation and appearance of the tumor (usually > 5 years), and (4) must be histologically proven and of different histological type from the original neoplasm. Table 1 shows few of the cases of glioma reported in literature of patients

Table 1: Glioma cases reported in literature of patients post treatment for acute lymphoblastic leukemia

Study	Age at diagnosis (Years)	Dose of radiation (Gray)	Latency (years)	Glioma histology
Walters et al, 1979	3	26.2	6	Astrocytoma
Salvati et al, 2008	10	24	22	Glioblastoma multiforme
Reiling et al, 1999	15.9	18	7	Glioblastoma multiforme
Joh et al, 2011	17	19.5	6	Glioblastoma multiforme
Brat et al, 1999	20	36	7	Anaplastic Astrocytoma
Salvati et al, 2008	26	24	26	Glioblastoma multiforme

post treatment for acute lymphoblastic leukemia.[5,6] Radiation induced gliomas tend to be of higher grade and show absence of somatic H3/IDH hotspot mutations.[5] The latency period from diagnosis of ALL to the onset of secondary glioma ranged from 1 to 26 years, with an average of 7.8 years. Our case had a latency period from the end of chemotherapy of 2 years and radiotherapy 5 years. The cumulative risk of secondary malignant brain tumors following treatment for ALL is 0.5–2.0% at 15 years and 4.91% at 30 years, which is a 10- to 20-fold greater risk than in age-matched controls.[7] The first fully documented case of CNS glioma following PCI for ALL was reported in 1979 by Walter's et al.[8] These tumors typically present in the pediatric population, have a characteristic substitution of methionine for lysine at residue 27 in either H3F3A or HIST1H3B/C genes or HIST1H3B/C genes,[9] generally occur in midline locations like thalamus, brainstem and spinal cord and so the role of surgery is primarily for diagnosis, owing to the surgical inaccessibility of most lesions. In our case, due to the lesion being in thalamic region, gross total resection (GTR) could not be done, so NTR was done. Data in adults is scarce, so treatment is based on extrapolation of results from the pediatric population. Chemotherapy has not shown any advantage over radiation alone but trials are ongoing to study a variety of chemotherapeutic agents.[10] These lesions are considered as high grade irrespective of histological features and location. Overall survival is typically 7–11 months in children and 8–19 months in adults.[10]

Conclusion

The diagnosis of H3K27 altered diffuse midline glioma in adults is itself rare and occurrence post chemotherapy and post PCI for treatment of ALL is very rare. Being highly aggressive malignancy, despite multimodality approach prognosis remains dismal at present.

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Role of Pulmonary Metastasectomy in Selected Cases of Solitary Lung Metastasis in Metastatic Breast Cancer Patients - Case Series and Review of Literature

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Abstract

Solitary pulmonary nodule (SPN) occurs uncommonly in treated cases of breast cancer (BC) which if treated surgically in selected patients can provide better survival to patients. However, the management of oligometastatic breast cancer having lung metastasis is still debatable. After completion of treatment of the primary BC, pulmonary metastasectomy can be offered to lesions which are completely resectable with functional operability. The prognosis depends upon factors such as disease free interval, receptor status, pattern of metastasis and most importantly, complete resection of the metastatic lesion. Here we report four cases of SPN developed in treated BC, three of them had metachronous presentation while one presented synchronously. All of them were treated surgically along with neoadjuvant or adjuvant management as indicated.

Keywords: Solitary Lung metastasis, Breast Cancer, Pulmonary metastasectomy

Introduction

Lung is the second most frequent site of metastasis in breast cancer (BC) patients accounting for 15–25%,[1] however solitary pulmonary metastasis is rare. It is usually asymptomatic with an aggressive progression if not treated. Treatment options available for pulmonary metastasis are in the form of systemic therapies like chemotherapy, targeted therapy and hormonal therapy, stereotactic body radiotherapy (SBRT) or surgical management. Treatment with systemic therapies alone provide a median survival of 18.9 to 22 months and a 10-year survival of 10%.[2] In a selected group of patients such as those with single metastasis and disease-free interval (DFI) of more than 36 months, pulmonary metastasectomy (PM) provides 5- year survival of 45%.[3]

Differentiation of the SPN into metastatic lesion from BC, primary lung disease or a benign condition based only on radiological diagnosis or DFI cannot be done,[4] hence mandating the need of pathological confirmation. However, in small sized lesions, preoperative biopsy may be very difficult based on size and location.

Video assisted Thoracoscopic Surgery (VATS) is a good available option in pulmonary lesions located in peripheral locations but in approximately 20% open procedure is required for deep locations to aid complete resection.[5] Complete resection of isolated pulmonary metastasis in the absence of other distant metastatic lesion can render the patient disease free and provide a survival benefit. Here we are sharing our experience of PM for SPN in BC patients by presenting four case scenarios, who were managed based upon the discussion done by the multidisciplinary team of our hospital.

Case Reports

Patient 1:

A 72-year-old lady with history of left BC treated with modified radical mastectomy (MRM) and adjuvant systemic therapy and radiation therapy (RT) 20 years back, presented to us in 2019 with a lump in right breast with PET CT showing an FDG avid lesion in upper inner and inner central quadrant of right breast and a soft tissue opacity (STO) in posterior segment of right upper lobe (RUL) of lung suggestive of metastasis (Figure 1). The diagnosis of BC was confirmed with histopathological examination (HPE) of the breast lump and the lung lesion. She then

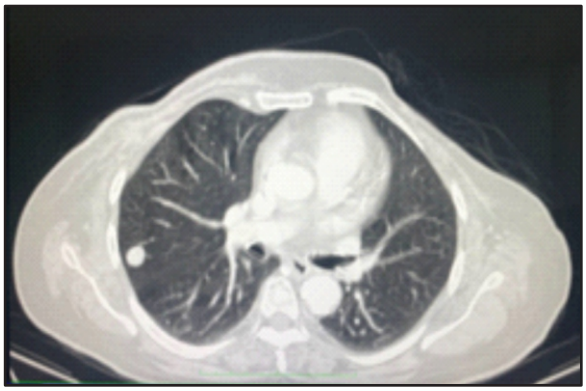

Figure 1: CT thorax showing 12 x 11 mm STO lesion in posterior segment of RUL

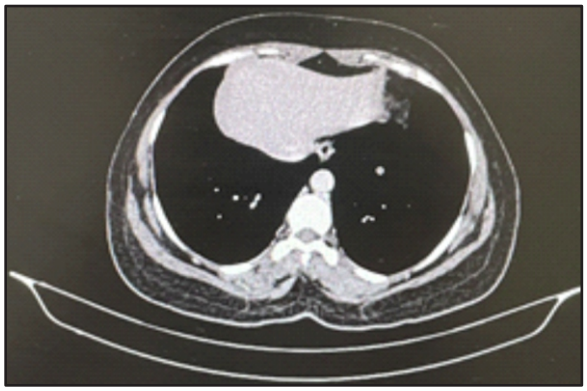

Figure 2: CECT thorax showing a soft tissue nodule in LLL

underwent right mastectomy + sentinel lymph node biopsy (SLNB) + Right VATS guided PM. Final HPE of the breast lesion was reported as DCIS, pTisN0(sn), hormone receptor (HR) negative. Histology of the lung lesion showed metastatic ductal carcinoma (MDC), Estrogen receptor (ER) positive, Progesterone receptor (PR) positive, Her 2 neu negative. She was then started on Hormonal therapy with tamoxifen. Patient is presently disease free (4 years) and is following up in our outpatient department (OPD) regularly.

Patient 2:

A 44-year-old lady, a known case of left BC diagnosed in October 2014 post left MRM (done outside), presented to us in November 2021 with a recurrent nodule over left chest wall. CECT thorax (Figure 2) done showed a 7x6 mm STO lesion in left lateral chest wall and another small sized lesion of 9x8 mm STO in antero-basal segment in left lower lobe (LLL). Biopsy of chest wall lesion confirmed recurrent invasive BC with ER+/ PR+/ Her 2 neu -, for which wide local excision (WLE) was done. She was re-evaluated after 3 months with PET CT which displayed STO lesion in LLL of size approximately 1 x 1 cm, highly suspicious of metastasis, for which VATS metastasectomy was performed. Final histology report suggested pulmonary hamartoma with no evidence of malignancy. She was then started on Hormonal therapy (Tab Tamoxifen) and is under our regular follow up for 10 months.

Patient 3:

A 50-year-old lady, a known case of left BC post left MRM done outside in the year 2016, presented to us in 2018 with CECT Thorax showing a 10x14x5 mm lesion in posterior segment of RUL. Biopsy of this lesion showed a poorly differentiated metastatic carcinoma; ER, PR and Her2 neu were negative. RUL PM was performed for the lung lesion. On final histology MDC was reported; ER-/ PR -/ Her 2 neu –. After 3 years of follow up, CECT Thorax showed a 13x13 mm STO lesion in posterior segment RUL with a possibility of metastasis, which was confirmed as MDC on biopsy. She received palliative chemotherapy and RT for this recurrence but unfortunately after 1 year succumbed to the progressive lung metastasis.

Patient 4:

A 49-year-old lady, presented to us with a diagnosis of right BC (T2N1M1), with whole body PET CT scan showing a 1 x 0.9 cm subpleural nodule in the lingual segment of left lung, suspicious for metastasis. Review biopsy at our center reported the breast nodule as IDC grade III, ER-/PR-/Her2 neu+ and lung nodule as metastatic carcinoma. She received systemic chemotherapy followed by a PET CT scan which showed a reduction in breast lesion size but the subpleural nodule of left lung increased to 1.5 x 1.2 cm size. She then underwent right MRM and VATS guided PM. The final histology was IDC grade III with DCIS, ypT2N1 in the MRM specimen and MDC in lung nodule. She received adjuvant RT and targeted therapy. She is regularly following up in OPD and is disease free for the last 1 year.

Discussion

There is a very low incidence of SPN, approximately 0.4% in treated cases of primary BC.[6] According to Sascha et.al criteria for PM with curative intent are a) controlled primary disease b) no extra thoracic, synchronous metastasis c) operable disease d) good operative risk e) feasibility of all lung lesion resection.[7] Staren et. al have shown an improved 5-year overall survival (OS) (36% versus 11%), median survival of 32 to 96.6 months in surgically treated BC patients with pulmonary metastasis compared with medically treated individuals.[6] Table 1 demonstrates the literature supporting the role of PM in improving

Table 1: Literature supporting the role of PM in improving survival outcomes in metastatic BC (mBC)

Study	No. of Patients	Median Disease free interval	Median Survival	5-year Survival rate
Staren et al.[6]	33	48 months	55 months	36 %
G. Friedel et al.[3]	467	43 months	37 months	38 %
Tanaka F et al.[4]	52	66.8 months	32 months	30.8 %
Meimarakis et al.[8]	81	-	82.4 months	59.6 %
Chan et al.[9]	13	22.1 months	30.57 months	-
Planchard et al.[10]	125	36 months	50.4 months	45 %

survival outcomes in metastatic BC (mBC). Most important prognostic factor for post metastasectomy survival is complete resection of all metastasis. PM is associated with a mortality rate of 0 to 3%.[7] Post-operative complications occur in 5.8% to 23.8% cases, with pneumonia and arrythmia in majority of cases followed by atelectasis, pneumothorax and hemothorax.[7] Fortunately, none of our patients developed any of these postoperative complications.

Conclusion

Management of SPN in case of mBC is a surgical challenge. With this experience, we would like to emphasise on the need of multidisciplinary team approach for adequate management in such cases and also to consider histological confirmation of the lung lesion before surgery wherever feasible.

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A Rare Association in Ovarian Mixed Germ Cell Malignancy: A Case Report

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Summary

The Ovarian germ cell tumors, mixed variant constitute a rare malignancy with two or more germ cell elements frequently presenting among the adolescents. These tumors exhibit an aggressive growth pattern. However, the prognosis are reported to be outstanding. This article reports a case with rarest blend of four germ cell elements. An unmarried 19-years-old girl presented with chief complaint of pain over the abdomen lasting since a month. Clinical evaluation suggested a 14x18x25 cm ovarian unilateral solid-cystic lesion necessitating surgical intervention with tumor marker analysis showing an elevated β-HCG, LDH and CA-125. A fertility-sparing surgical procedure of staging laparotomy was performed. The final histopathology report reported a high-grade stage II mixed germ cell tumor. The tumor components included Choriocarcinoma, Embryonal carcinoma, Yolk sac tumor and mature teratomatous glandular component. Adjuvant chemotherapy was administered for 3 cycles. The patient was found disease-free on post-treatment surveillance for 6 months. An integrated approach including surgery followed by chemotherapy and adequate surveillance provides good results in the management of these malignancies.

Keywords: Mixed germ cell tumor, fertility sparing surgery, chemotherapy, choriocarcinoma, teratoma

Introduction

The mixed variant of germ cell tumors (MGCT) are relatively rare malignancies of the ovary that contribute up to 5% of the spectrum of germ cell tumors.[1] MGCT are common among the adolescent age group peaking at 16 years of age with a broad range of presentation from 6 to 40 years.[2] MGCT constitute a malignant subtype with two or more germ cell components.[1] Dysgerminoma and yolk sac tumor are commonest reported combination.[3] These tumors are aggressive, however the prognosis are reported to be excellent as per the literature data.[4] Surgical staging with preservation of reproductive potential is considered the standard of care.[1] In this article, a case of MGCT with rarest four compound elements of germ cell which include choriocarcinoma, embryonal carcinoma, yolk sac tumor and mature teratomatous glandular component is reported.

Case Summary

A 19-years unmarried girl turned up in the outpatient division of the department of gynecologic oncology of The Gujarat Cancer and Research Institute, with a chief complaint of abdominal pain for the past one month. There were no other associated symptoms or significant histories. She had regular menstrual cycles. Clinically, her performance status was good with a Karnofsky grade of 90. Her general examination revealed normal secondary sexual characteristics. On per abdominal examination, there was a large mass, cystic to firm in consistency reaching almost to the xiphisternum with restricted mobility. Her magnetic resonance imaging revealed a 14x18x25 cm solid-cystic lesion causing moderate ureteric compression. Her tumor marker analysis showed an elevated β-HCG (128186 IU/L), LDH (1465 U/L) and CA-125 (58.5 U/mL). Other parameters were within normal limits. In view of elevated β-HCG, a detailed history pertaining to conception to rule out gestational choriocarcinoma was elicited. Followed by this, a provisional diagnosis of mixed germ cell tumor was made. Primary staging laparotomy was performed on the patient. The intraoperative finding revealed a right-sided adnexal mass which was sent for frozen section analysis (Figure 1). The report was suggestive of a mixed germ cell tumor. The staging included peritoneal wash sampling, multiple peritoneal biopsies and a biopsy from the suspicious area over the right fallopian tube, right-sided pelvic lymph node dissection and infracolic omentectomy. The uterus and left ovary were preserved. Her intraoperative and postoperative

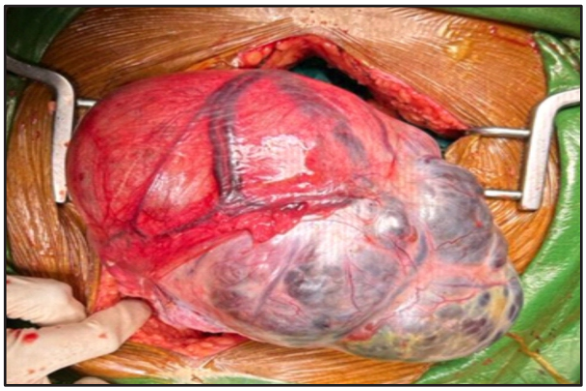

Figure 1: Intraoperative picture showing the tumor

periods were uneventful. Her final histopathology report showed a high-grade MGCT with varied elements of Choriocarcinoma in majority and Embryonal carcinoma followed by Yolk sac tumor and mature teratomatous glandular components in decreasing composition constituting 50%, 30%, 15% and 5% of the tumor respectively. The biopsy from the suspicious area over the fallopian tube turned out to be positive for tumor foci. Hence, the final stage as per FIGO classification was IIA. The patient received 3 cycles of adjuvant chemotherapy with Bleomycin, Etoposide and Vincristine (BEP) regimen. The patient is under routine follow-up and is now disease-free. A control imaging with a computed tomography scan post 6 months follow-up was reported normal.

Discussion

Germ cell tumors encompass different histopathological varieties that include, dysgerminomas, yolk sac tumors, embryonal carcinomas, choriocarcinomas, teratomas including mature and immature teratoma, mixed germ cell tumors, gonadoblastomas and monodermal teratomas classified based on the WHO system. MGCT by definition comprise of two or more germ cell components.[4] As quoted in a review article by Kurman and Norris, the dysgeminoma component is the commonest reported in 80%. The other components include endodermal sinus tumor and in descending trend followed by immature teratoma, choriocarcinoma and embryonal carcinoma constituting 70%, 53% and 20%, respectively.[5] In our patient, rare fusion of four components were noted which included, choriocarcinoma, embryonal carcinoma, yolk sac tumor and mature teratomatous glandular components with choriocarcinoma and embryonal carcinoma being the major components contributing to 50% and 30%, respectively.

The major presenting symptom of germ cell tumor is reported to be abdominal pain and distension in around 85% of the patients likewise the presenting symptom in our patient. A few other rare presenting symptoms include acute manifestation due to rupture or hemorrhage.[6] The diagnosis however depends on a few other findings like tumor marker levels and imaging. The tumor markers specifically elevated include Lactate dehydrogenase (LDH), Alpha fetoprotein (AFP) and Human chorionic gonadotropin (β-HCG) in dysgerminoma, yolk sac tumor and choriocarcinoma, respectively. Elevated levels of AFP and β-HCG are also exhibited in embryonal tumors.[7] Accordingly, MGCT can present with a combination of elevated markers as in our patient where LDH and β-HCG were raised.

Imaging plays an important role in the staging workup of the tumor with few characteristic findings which include dysgerminomas appearing as a multilobulated lesion with enhanced septa and non-dysgerminomatous tumors appearing as solid cystic lesions with areas of hemorrhage.[8,9] This is in accordance with the imaging findings of our case study.

Management includes surgical intervention as the mainstay of treatment with fertility-sparing as the crucial concern in addition to debulking the tumor.[1] The unique feature of the predominant unilaterality of germ cell tumors makes fertility sparing a feasible option. Most of the tumors are unilateral except for 5-15% of cases which are bilateral.[6] However, bilateral oophorectomy is adopted in cases of dysgenetic gonads.[9] Combination adjuvant chemotherapy using Bleomycin, Etoposide and Cisplatin (BEP regimen) provides promising results in germ cell tumors with overall survival of up to 93% as reported by Newton et al.[10] This is consistent with the result in our study with a good response to surgery followed by chemotherapy in stage II and the patient evaluated to be disease-free on 6 months post-treatment surveillance.

Conclusion

Germ cell tumors overall exhibit a good prognosis. Hence, timely and appropriate intervention is warranted in the management of these cases. Fertility sparing being a concern in the management of young females is feasible in these tumors. An integrated approach including surgery followed by chemotherapy and adequate surveillance plays a key role in the management.

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Presentations at Clinical Meetings

(July 2023 to December 2023)

Sr. No.	Date	Speaker / Department	Title
1	14.07.2023	Pathade Rahul Medical Oncology	Analysis of the Mortality Trends of 23 Major Cancers in the Indian Population Between 2000 and 2019: A Jointpoint Regression Analysis
		Pandit Apexa Molecular Diagnostics & Research Lab-III	Microarray Data Reveal Potential Genes that Regulate Triple-Negative Breast Cancer
2	28.07.2023	Salunke Abhijeet Surgical Oncology	Use of Virtual Reality (VR) in Oncology
		Patel Dharmesh Cytogenetic Laboratory	Cytogenetics and Molecular Genetics in Pediatric Acute Lymphoblastic Leukemia (ALL) and its Correlation with Induction Outcomes
3	14.08.2023	Burde Kaustubh Gynecological Oncology	Two-Antibody Staining Method, A Cost-Saving Strategy for Universal Lynch Syndrome Screening in Endometrial Cancers
		Patel Foram Microbiology	Inoculation Injuries: An Analysis at GCRI
4	28.08.2023	Ghosh Nilanjan Surgical Oncology	Effect of Peritumoral Infiltration of Local Anesthetic Before Surgery on Survival in Early Breast Cancer
		Sunny Goutham Medical Oncology	Artificial Intelligence in Oncology
5	12.09.2023	Bandi Arpit Surgical Oncology	Compartment Resection of Tongue Tumors
		Shah Veer Surgical Oncology	Loco-regional Failure During and After Short-cause Radiotherapy Followed by Chemotherapy and Surgery: A 5-Year Follow-up of the RAPIDO Trial
6	26.09.2023	Agrawal Misha Anesthesia	Society of Onco-Anesthesia and Perioperative Care Consensus Guidelines for Perioperative Management of Patients for Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy
		Suthar Ritesh Nuclear Medicine	Response Criteria in Oncologic Imaging: Review of Traditional and New Criteria
7	11.10.2023	Shah Nisarg Surgical Oncology	Adenocarcinoma of Esophagus and GE junction: Neo-AEGIS trail and our Institutional Experience
8	14.12.2023	Padival Ashika Gynecological Oncology	Venous Thromboembolism in Cancer Patients: ESMO Clinical Practice Guideline
		Gondha Shewta Onco-Pathology	PD-L1 Testing by Immunohistochemistry in Immuno-oncology
9	28.12.2023	Rajvik Kruti Immunohematology Lab	Concordance Between Microsatellite Instability and Mismatch Repair Protein Expression in Colorectal Cancer and their Clinicopathological Characteristics: A Retrospective Analysis of 502 Cases
		Gattani Shreya Medical Oncology	Precision Oncology Adoption: The Future is Now

Presentations at Clinical Meetings

(January 2024 to June 2024)

Sr. No.	Date	Speaker / Department	Title
1	25.01.2024	Bhadoria Jitendra Neuro Oncology	Decision Making in Spinal Cord and Vertebral Column Lesion
		Trivedi Dhruva Molecular Diagnostics & Research Lab-I	Rapid Detection of Mutations in CSF-cfTNA with the Genexus Integrated Sequencer
2	12.02.2024	Desai Yash Radiology	Role of MRI in Differentiating Recurrent/Residual Tumor from Radiation Injury in Radiotherapy Treated Cases of Brain Tumors
		Mohan Vaishakh Surgical Oncology	De-escalation Strategies in Treatment of Oropharyngeal Squamous Cell Carcinoma
3	26.02.2024	Mandalia Toral Molecular Diagnostics & Research Lab-II	Next Generation Sequencing Panel Test in Myeloid Neoplasms and Evaluation with the Clinical Results
		Dr. Bhuvana Radiation Oncology	CyberKnife: An Initial Institutional Experience
4	12.03.2024	Kukadia Savan Palliative Medicine	Utilization of Coeliac Plexus Block for Severe Abdominal Pain Due to Malignancy
		Shah Manali Physiotherapy	The Effects of Complex Decongestive Therapy on Pain and Functionality in Individuals with Breast Cancer who Developed Adhesive Capsulitis Due to Lymphedema: An Evaluation by an Isokinetic Computerized System
5	26.03.2024	Patnaik Abhinash Medical Oncology	Breast Cancer Survival in India Across 11 Geographic Areas Under the National Cancer Registry Programme
		Joshi Jigna Molecular Diagnostics & Research Lab-III	A Three- MicroRNA Signature as a Potential Biomarker for the Early Detection of Oral Cancer
6	27.06.2024	Patel Dhruv Orthopedic Oncology	Intraosseous Schwannoma of the Upper Extremity: A Single Institutional Experience and Review of Literature
		Trivedi Pina Cytogenetic Laboratory	Frequency and Pattern of Chromosomal Abnormalities in Acute Myeloid Leukemia from Western India: A Retrospective Study

About the Journal and Instructions to Authors

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Central Catheter Care Clinic

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Nursing Services
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Central catheter care clinic at The Gujarat Cancer and Research (GCRI) is run by trained Central Venous Access Device (CVAD) Nurse. In Central Venous Catheter (CVC) care clinic, two trained staff have been working and both have taken training from TATA Memorial hospital Mumbai. GCRI is under the administrative responsibility of the comprehensive care of cancer.

Introduction

For decades, access devices have been used to deliver complex and diverse treatments to patients with cancer. IV therapy is an integral part of modern medicine and nursing, as it is practiced in every healthcare setting, from hospital to home. A new generation of access devices are quickly being adapted to provide a safe means to administer therapies in to body system.

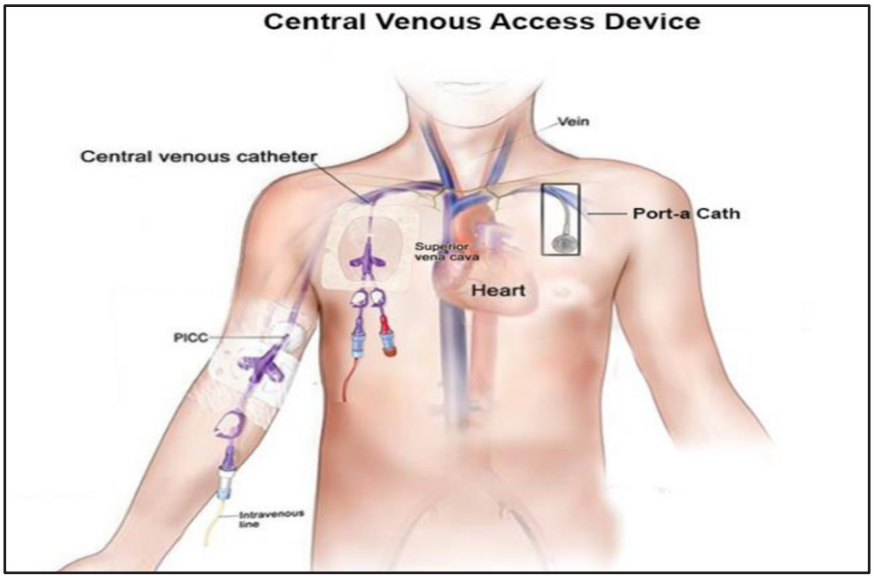
GCRI has a fully developed functional central catheter clinic which aims to provide comprehensive care to patients and is involved in first line research and believes that will help trained nurses to take keen interest with confidence and responsibility in patient care. These clinics play crucial role in ensuring the optimal function, maintenance and safety of these devices, which are vital for the delivery of intravenous medications, fluids and therapies.

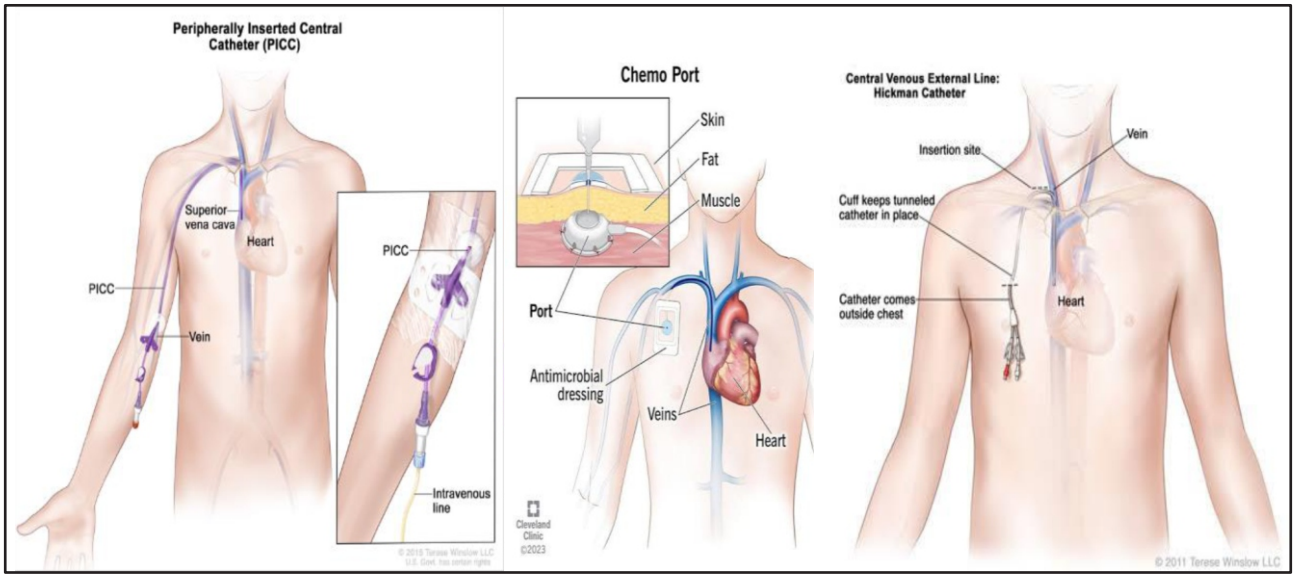
Nurses in CVC care clinics are integral members of the healthcare team, providing comprehensive care and support to patients with CVADs. Their role encompasses various responsibilities aimed at optimizing patient outcomes and enhancing quality of life.

Clinical services provided at CVC care clinic

1. Assessment and monitoring
2. Post insertion counselling
3. Education and training
4. Care and maintenance
5. Collaboration and communication
6. Management of complications
7. Home going instructions like,
   - Bathing
   - Clothing
   - Dressing
   - Flushing
   - Cap changing
   - Travelling

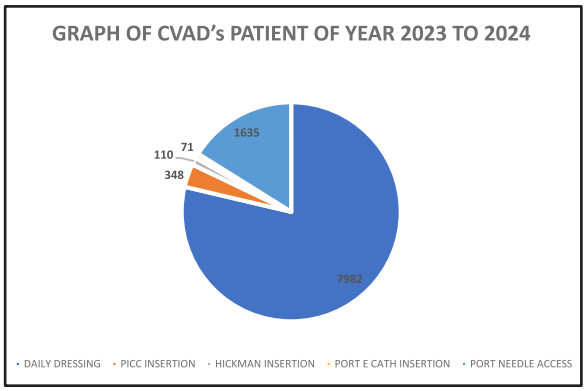
Keeping detailed record of indoor & outdoor patients





Record Of Cvad's Patient of Year 2023 To 2024

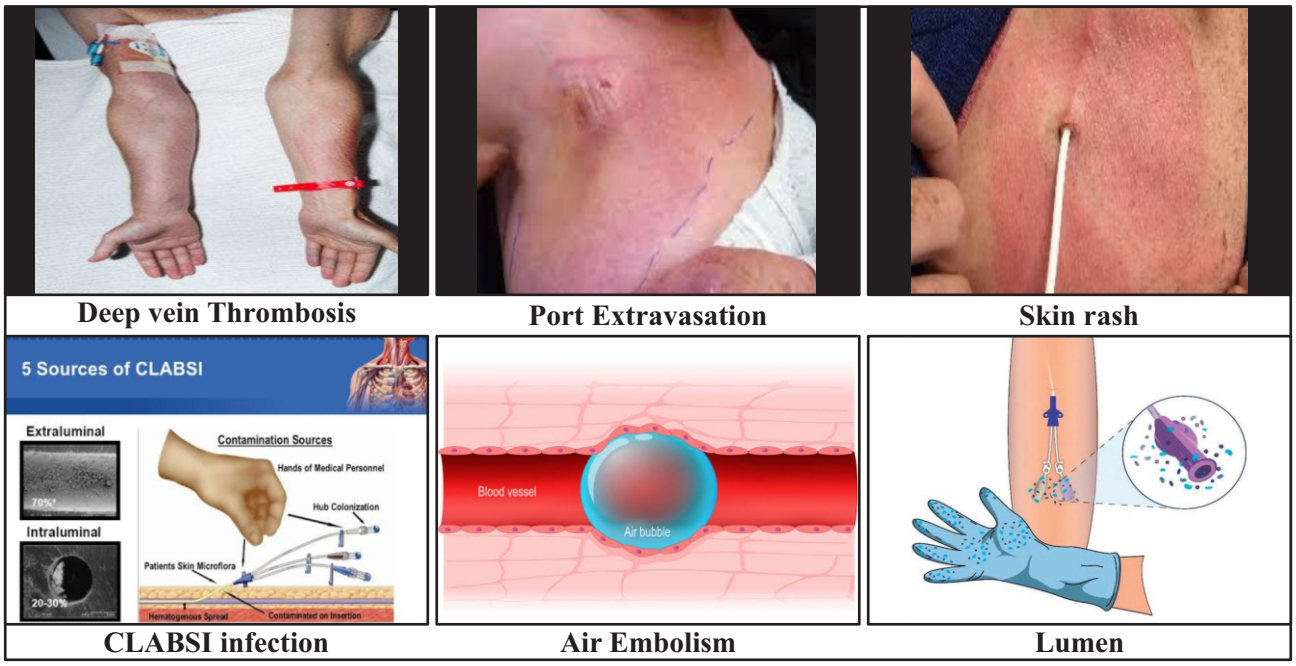
Daily Derssing	PICC Insertion	Hickman Insertion	Port E Cath Insertion	Port Needle Access
7982	348	110	71	1635



Complications of Long-Term Venous Access Devices

1. Non-infectious complications like air embolism, arrhythmias, brachial plexus, arterial puncture, venous perforation, cardiac tamponade, catheter fracture, catheter tip malposition, exit site bleeding or hematoma, catheter occlusion, deep vein thrombosis
2. Infectious complications like catheter related blood stream infection, phlebitis, extravasation, lumen infection, exit site infection, skin rash and skin injury

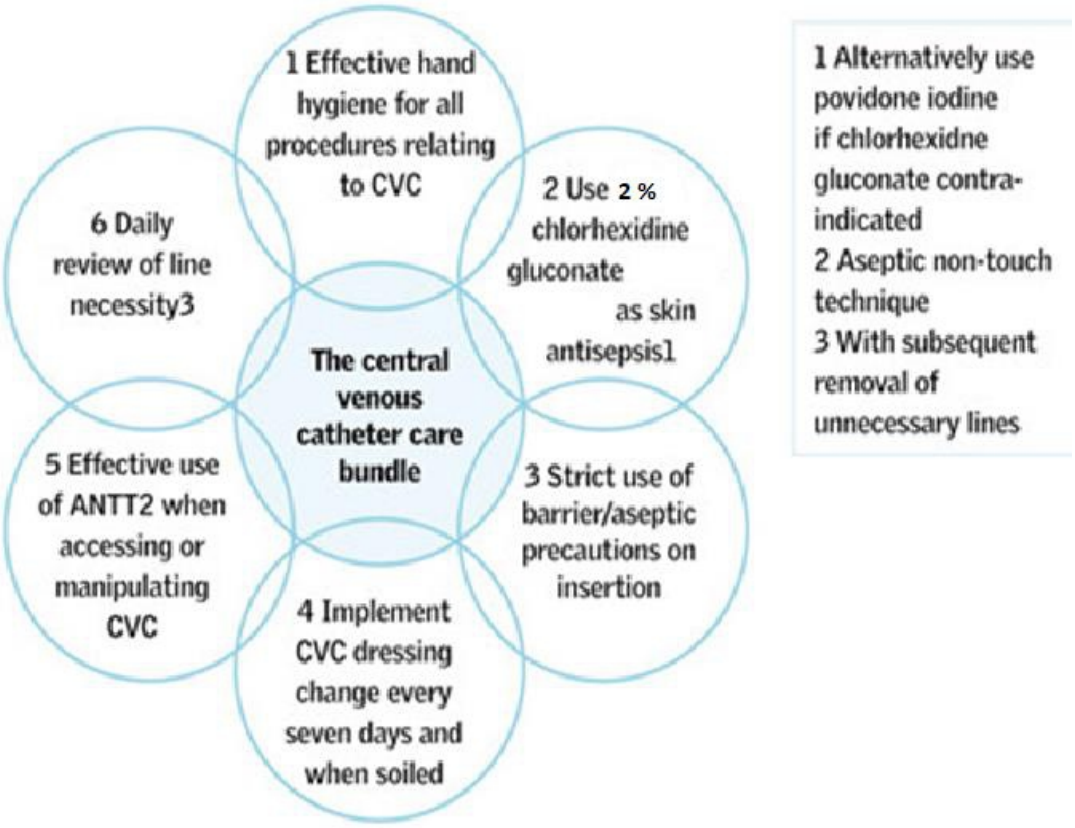
CVAD Complication images:

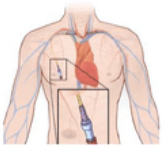
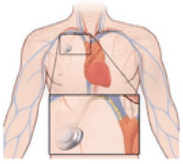
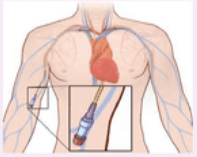


Managing complications related to CVADs involves various approaches, depending on the specific encountered. Regular assessment, vigilant monitoring, and prompt intervention are key components of managing complications associated with CVADs. Additionally, evidence based guidelines and protocols to optimize patient outcomes.

Education and documentation for access devices

- Staff training and education
- Patient documentation
- Legal standard of care
- Continuing competence and professional improvement
- Care and maintenance of access device
- Essentials for patient and caregiver education
- Demonstration of self-care skills related to access device as appropriate
- Additional resources for the patient and caregiver



Main types	Characteristics	Duration of Use	Advantages	Limitations	Schematic representation
Tunneled central venous catheter (Hickman®, Groshong®, Broviac®).	-Distal end open to the outside with subcutaneous (tunneled) way. -A Dacron cuff attached to the line induces a local fibrotic reaction and anchors the cuff to the tissues.	Months to years	-Longer duration. -Lower risk of infection and thrombosis.	-Access for insertion needs medical radiology, surgery or anesthesia equipment. -Higher cost. -Limited flow.	
Central venous access device with subcutaneous reservoir *(Port or port-a-cath type).*	-Special tunneled venous line connected to a subcutaneous reservoir. - A non-coring needle Is needed to access the thick port membrane	Months to years	-Longer duration. -Lower risk of infection and thrombosis. -Comfortable and cosmetic (no visible line).	-Access for insertion needs medical radiology, surgery or anesthesia equipment. -Need for special training/equipment for nurses to access -Higher cost. -Limited flows. -6 weekly flushing, heparin locking -Access to device requires skin puncture each time.	
Peripheral insertion central catheter (PICC type).	-Line is inserted by a peripheral vein (basilic, cephalic, etc.) passing through the arm. Correct tip location: superior vena cava/right atrium junction.	Months	- Easier to insert and remove by trained nurses. -Lower cost.	-Increased risk of infection. -Increased risk of thrombosis. -Requires weekly care by trained nurses.	

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