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Content

Editorial Board

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Editorial

A GOOD RESEARCH IN A GOOD WRITE UP

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The Setting up of the Sri Lanka Cancer Research Group, by the Sri Lanka College of Oncologists is a leap across the threshold. It was a real gratification to see that several scientific papers were presented and published by our young oncologists and postgraduate trainees, clearly displaying their excellent work in varying subject areas. Congratulations to all!

Placing an attractive manuscript correctly in a journal is of great value to readers and the authors as well as to their respective institutions. Globally, each year, there are millions of manuscripts prepared and submitted for publication. From them about 1/3rd gets rejected while 1/3rd gain acceptance with or without conditions. About a half of them get recommended for major or minor revisions. At the end however nearly half get accepted and another half get rejected. Less than 5% would be withdrawn. It is still early for us to assess the Sri Lankan scenario specially with regards to oncology manuscripts, but it is to be expected that a considerable number of manuscripts will get rejected during the review process.

Studies on cancer are a very diverse and complex field of research. Despite many advances in recent years, there is a lot of unexplored topics. For example most bio markers are not mutually exclusive but, do complement each other. This itself warrants major research that would need to recruit a larger number of patients. This highlights the importance of collaboration in research rather than working in isolated small groups. (Although the definition of 'small' would vary according to the main study objective.)

The majority of research studies can be categorized in to audits of patient data, observational studies, clinical trials and laboratory analyses. A small study can be conducted quickly and published within a short time-frame. In addition, obtaining ethical and institutional approval is much easier in small studies compared with large multi-centre studies. Small studies do not generally yield reliable or precise estimates. ,, Although larger studies will take longer to complete they are likely to yield more reliable results . The existing network of the few cancer centers in Sri Lanka permits our researchers to conduct 'well designed' small studies which can lead to well conducted multi-centre studies on a larger scale. There shouldn't be undue hesitancy in conducting small studies if resources dictate so, provided they are well designed, well executed and interpreted carefully. Therefore, it is important to make strong conclusions about study outcomes (whether the results are positive or not) only after analyzing the study carefully.

We have seen many editorial boards of European Journals often review very interesting studies, which have small sample size. While most boards encourage the best use of such data, editors are well aware that small studies have many limitations.

A good 'Title' is a key factor that would increase the chance of citation when publishing clinical trials in a journal. A compact title with direct relevance to its content better attract readers. Shadow titles and exaggerations end up in reader's disappointment. One of the key moments in the process of publishing your work, is by receiving comments from reviewers. Editorial 'peer review' is widely regarded as an essential component of quality assurance in academic medical papers. It often provides an indication of whether all of your hard work has paid off or not. But remember that peer reviews rarely focus upon the strengths of the paper and often that can be interpreted as unreasonably critical. However, reviewers best accompany their comments with additional narration on the paper that has been submitted. You may even be asked to respond to the reviewer's comments in return. The final verdict comes from the Editor of the publication. Understanding the reliability of the peer-review process while helping editors understand the limitations of reviewers' recommendations is a must. Still there are a few authors making obvious deviations beyond basic formational standards.

THe head of Department or a research inclined person with experience would generally determine the standards of a research. Regular research discussions between researchers in our departments would certainly help to stimulate scientific proficiency. Those who are more

experienced in each department should support those who still need guidance in research and in publishing. Such attitude would furthermore, reduce egotistical motives and create an excellent academic atmosphere, which still needs to be developed in our set up.

It is becoming a more frequent observation that in academic journals, the English Language has been used in a manner that is not suitable or proper in the circumstances. Though the scientific medical terminology is still derived from ancient Greek and Latin, English is the present lingua franca in science. Just as much a wrong prescription could give a wrong medicine, outcomes of improper use of language and terminology would be catastrophic too. There are considerable number of manuscripts still rejected by the international journals purely on improper language use rather than their scientific value.

Busy readers such as clinicians mainly focus on a limited number of journals, chosen according to the journals' clinical focus. Authors spend considerable energy preparing articles for specific journals, straightening out their presentations to meet the needs and expectations of client readership etc. Academic institutions use publications as a factor in making tenure and promotion decisions. If the work remains complicit, the author should not worry about the processes, the editors use to assess your article.

I take this opportunity to honour the contribution of Editor-in-Chief for final editing of published articles and the support rendered by our authors, reviewers, the publishers and the office bearers of SLCO for their relentless support in bringing out this 4th edition of 'The Sri Lanka Journal of Cancer' in the middle of a prevailing COVID– 19 crisis.

Guidelines for practice recommendations for breast radiotherapy of early and locally advanced breast cancer in Sri Lanka

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1. Summary of indications for adjuvant radiotherapy(1–7)

Breast conservation	For all patients.(3) Consider avoiding if above 65 years DCIS or T1/ T2 tumours less than 3cm, node negative and ER+ PR+ Her2-ve, Grade 1-2 and will take endocrine therapy for 5 years (smaller benefit) Consider partial breast treatment for invasive ductal cancers T1/2No and less than 3cm, margin more than 1mm, No lymphovascular invasion, and tumour bed boost not offered.
Post mastectomy+/- reconstruction	For T4 primary or positive chest wall margin or if SCF radiation indicated
Supraclavicular fossa (level3 and 4 nodes) after axilla dissection	4 positive nodes or 1-3 nodes with adverse risk Factors If neoadjuvant chemotherapy given use combination of prechemotherapy FNAC and evidence of post chemotherapy lymph node fibrosis as evidence of lymph node involvement
SCF and Axilla	Indicated in Inadequate dissection especially in context of surgeons using Z11 as rationale to not return to offer axillary clearance Axillary boost not indicated for extensive ECE after axillary dissection but if given needs discussion regarding excess lymphedema risk with patients and careful CT planning
IMN (8–10)	lateral tumours pT4 or pN2 or macroscopically enlarged IMN nodes For medial tumours with pN1 Only when cardiac sparing techniques are used

2. Prerequisites for radiotherapy treatment planning

The Treating clinician should make sure data on clinical exam findings, mammogram, US breast, staging CT, surgical notes and histology are available at the time of radiotherapy planning. Special attention should be given to pre-treatment CT/US scan to note features of primary as well as site and size of enlarged regional lymph nodes.

If referring from peripheral clinics timely referral to regional centres with aim of starting radiotherapy at 4 weeks after end of chemotherapy.

3. CT Simulation

Patient positioned supine with both arms up on breast board with an incline of 10 degrees

For Breast only scan Lung apices to bottom of lungs (7 cm below breast)

For breast and SCF start scan at level of mandible and end at bottom of lungs (7 cm below breast)

Wire scar. Mark 1cm above and below opposite breast in mastectomy patients and mark upper lower and lateral limits of intact breast

Slice thickness 5mm. No contrast unless IMN treated

0.5cm bolus for 6MV and 1cm for 10MV for T4 tumours (due to skin invasion), involved skin margin, dermal invasion or those with extensive lymphovascular invasion.

4. Voluntary Deep inspiratory breath hold (11–17)

Need training in technique prior to implementation at individual centres

Ideally used for all patients who are treated with radiotherapy to left breast with the aim of avoiding the heart in the radiotherapy field. Due to limited resources prioritise for patients with left lower quadrant tumours and cardiac risk factors such as anthracycline use diabetes hypertension and also patients with longer life expectancy. Mandatory for all left breast patients treated with FAST Forward protocol.

Step 1. Patient practices to hold their breath for 20 seconds

Patients will be educated on breath-hold and will be asked to practise holding their breath for 20 second periods at home. The practice sessions will take place between the decision for radiotherapy and the date for the treatment planning scan. Those who are unable to tolerate breath-hold after three practice sessions in clinic will receive standard free-breathing radiotherapy treatment.

Step 2. CT simulation (planning scan)

2 planning scans will take place.

First, scan in free breathing as per protocol with placement of lateral tattoos.

Next, the patient will be asked to hold their breath in maximum comfortable inspiration and another planning scan will take place. The displacement of lateral tattoos on laser will be recorded.

Step 3 Radiotherapy planning

If heart is not in the field the free breathing image can be used for planning.

If any heart in field use the VBH simulated image for planning techniques and examples of anatomic and dosimetric advantages.

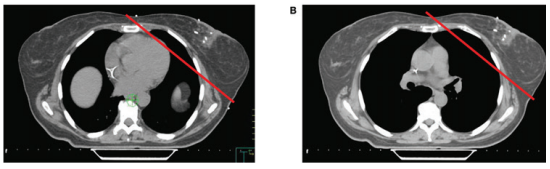


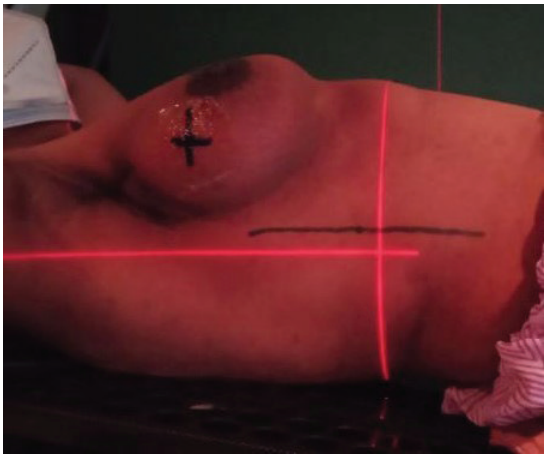
Figure 1 Deep inspiration breath hold (DIBH)

Axial CT slices from the same level of the breast in free breathing (A) and DIBH (B) The red line indicates the tangential radiation field used for whole breast radiation treatment. Note that the heart is easily excluded in the DIBH scan.

Step 4 Treatment

During treatment patients will be first aligned on the CT couch using markers (tattoos) placed during their previous free breathing planning CT scan. Patients will be instructed to hold their breath as practiced and radiographers will monitor alignment of tattoos to lasers via CCTV. Treatment beam will be manually switched on when reference tattoos are aligned to lasers. If treating a boost (SIB or sequential) treatment will need multiple breath holds.

(a) Free breathing



(b) Deep inspiratory breath hold

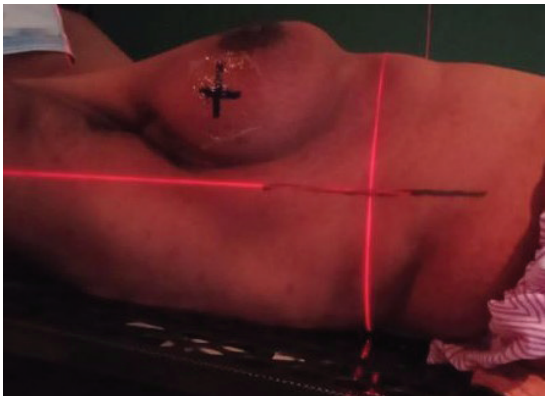


Figure 2 Tattoo and laser position in free breathing and DIBH.

Before starting Voluntary deep inspiration breathold in a centre it is advisable to get EPI displacement data for 10 consecutive left breast cancer patients treated with standard

free breathing tangential field radiotherapy (minimum of 5 EPI images per beam for each patient). This data will act as a baseline comparison for voluntary DIBH EPI displacement data.

5. Treatment volume for 3D planning (18–20)

Clinicians should attempt to volume breast and axillary lymph node levels when appropriate as per the ESTRO/ASTRO/RADCOMP atlases and adopt to specific patient situations. Following is a general summary of treatment volumes

Post mastectomy

A CTV is only defined if an inverse planning IMRT plan is necessary. Otherwise only a field is placed to define the treatment volume.(21,22)

Whole breast volume CTV

Visible breast tissue up to deep fascia. Exclude muscle and ribs and clip by 5mm from skin surface

CTV to PTV of 1cm is recommended. This includes 5 mm to account for breast motion during quiet breathing and another 5mm for set up uncertainties.

If there is uncertainty regarding the stability of the tumour cavity relative to the chest wall especially in patients with larger breasts a slightly larger CTV-PTV margin may be needed. (58 IMPORT HI)

Boost volume(23,24)

CTV tb(tumour bed) = clips/surgical cavity/any change in surrounding architecture bound by 5mm from skin surface and laterally and posteriorly by CTV breast

CTV high risk = CTV tumour bed + 2cm clipped by 5mm from skin surface and posteriorly and laterally by CTV standard.

Based on IMPORT trials CTV high risk is the area most at risk of recurrence in this area Ensure this area is covered by 100% of the dose.

PTV boost =CTV+0.5 cm bound by breast PTV

Delineation of tumour bed (CTV tb)(23,24)

Recommended localisation method is tumour clips and any change in surrounding architecture. If seroma is present an ultrasound or CT/MRI can visualise tumour cavity. Clinical: method if impossible to adopt above methods combination of Pre-operative imaging, Surgical note and Palpation of surgical cavity, Information of depth of tumour bed from CT planning scan N.B surgical scar may be placed away from tumour

SIB can be used only if surgical clips are present as per IMPORT HIGH protocol

Partial breast volume (Ref IMPORT LOW trial protocol planning pack appendix 1)

The partial breast CTV is not a precise anatomical entity, but approximates to a quadrant of the breast. It is based on the pattern of residual disease reported in whole organ sections of mastectomy specimens.

In practice, the tumour bed is firstly identified as above.(CTV tb)

This is grown by 15 mm to give the partial breast CTV, bound by 5mm from the skin surface and should not extend beyond the pectoral fascia posteriorly. If the pectoral fascia is not visible, then it should be no more than 5mm from the lung/chest wall interface. The actual CTV around the tumour bed should approximate to the volume of a breast quadrant.

A PTV margin is then added (usually 10mm) to give the partial breast PTV, bound by 5mm from the skin surface but unmodified posteriorly

Lymph node volumes (Reference ESTRO/RTOG/ RADCOMP atlases)

(For comparison chart of the atlases see appendix 2)

ESTRO guidelines uses a vessel to separate nodal stations and was designed for early stage breast cancer and thus smaller volumes. In comparison RTOG atlas uses larger volumes and is based on bony and muscle landmarks. For example the upper limit of the SCF is at the cranial extent of the subclavian artery in the ESTRO guidelines but it is at the caudal border of the cricoid in in RTOG atlas.

In the early stage BC (pT1-T2, pN0-1), including those patients with a limited number of positive lymph nodes treated with breast-conserving surgery, the ESTRO guidelines are preferred because of the improved coverage of the upper part of the axilla and greater sparing of OARs such as the thyroid gland.

For patients with more advanced stage T3-T4 or N2-N3 disease, those who undergo radical

mastectomy for locally advanced disease, those who receive neoadjuvant chemotherapy, or those who have gross supraclavicular involvement, the RTOG atlas remains the guideline of choice . However, in patients with high-risk disease, the IMN CTV should be delineated according to ESTRO or RADCOMP guidelines because better coverage can be ensured by these guidelines compared with the RTOG guidelines for IMN.(18)

If lymph nodes grossly involved prior to neoadjuvant chemotherapy make sure to assess nodal volume in pre chemotherapy CT scan and keep 1- 2 cm margin to PTV.(19)

6. Radiotherapy treatment fields for field based treatments

Post mastectomy

Superior : 1cm above breast tissue, as defined by the contra-lateral breast.

Inferior : 1cm below contralateral inferior mammary fold.

Lateral: Anterior border of latissimus dorsi. Superiorly use lateral border of pectoralis major. The contralateral breast can help to define the border.

Medial: Midline. If tumour approached midline, the medial border can be 1cm over the midline.

Whole breast

Superior – coverage of breast with a 1.0cm margin

Inferior – 1.0cm inferior to the position of the contralateral breast tissue

Medial – the midline

Lateral – 1.0cm lateral to the position of the ipsilateral breast tissue. The medial and lateral borders may be adjusted to reduce heart and lung volume in the field

Supraclavicular fossa

If nodes grossly involved prior to neoadjuvant chemotherapy/surgery recommend volume based approach(ESTRO).Delineation of pre treatment lymph nodes and add 2 cm margin

Superior - 3 cm above medial end of clavicle/ caudal border of cricoid cartilage

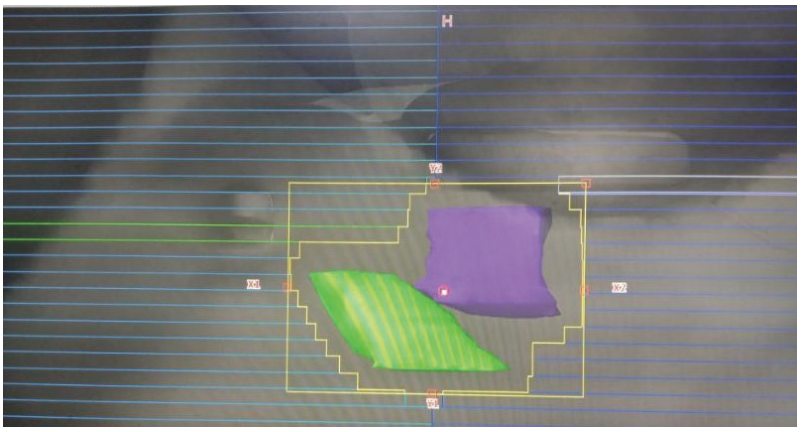
Inferior - Medial head of clavicle, no overlap with tangents

Medial - Lateral edge of vertebrae/Avoid larynx and spinal cord

Lateral - At junction of medial 2/3rd and lateral 1/3rd of clavicle or at coracoid process if bony land marks used

If CT simulated volumes used match to apical clip of level III axillary dissection if present on CT (1 cm lateral to 1st rib if no clip)

Figure 3 Level 3 and 4 outlined and placement of SCF field



Axilla Field Same as SCF field but Field extended to to the outer border of the head of the humerus, with consideration to MLC shielding of the acromio-clavicular joint and the head of humerus

7. Dose prescription

Breast/Chest wall T1-3 N0-1(25)

26Gy in 5 daily fractions (5.2Gy per #) in < 7 days (Fast Forward)

SCF and chest wall/whole breast including implants and chest reconstructions(21)

40.05Gy in 15 daily fractions (2.67Gy per #) in ≤21 days

50 Gy in 25 fractions is not recommended considering level A evidence for equivalence of the above regimes and additional cost and burden to machine treatment time unless in special situations such as for example patients with active scleroderma

Boost ,(25)

9Gy in 3 daily fractions (3.0Gy per #) in 3 days – to use if 15# breast regime is used

10Gy in 5 daily fractions (2.0Gy per #) use if 5# breast/chest wall regimen used.

Simultaneous Integrated Boost 48 Gy in 15

fractions

Supraclavicular fossa +/- Axilla +/- IMNs (22)

40.05Gy in 15 daily fractions (2.67Gy per #) in 21 days

Primary radiotherapy for locally advanced inoperable tumours not suitable for chemotherapy (21,26)

60 Gy in 30# (or EQD2 48 Gy in 15 or 55 Gy in 20) to macroscopic disease and 50.1 Gy in 30# (or 50 Gy in 20#)

(or EQD2 40 Gy in 15# over 3 weeks) to microscopic disease using IMRT.

For locally advanced nodal disease, consider boosting macroscopic disease to

60 Gy in 30# and treat microscopic disease with 50.1 Gy in 30#.

Ensure dose to brachial plexus is kept to less than 60 Gy.

7. Dose Objectives and Constraints (based on Fast forward/Import High/UK RCR 2016 consensus)

7.1 Dose objectives

For field based treatment

Coverage of breast with minimum 0.5 cm margin. Anterior margin 2 cm in air

For SCF aim for 95% to 107% of the prescribed dose, but accept 80% of the nodal target volume covered by 95% isodose. Hotspots of ≥107% will be limited to ≤2cm3

For volume based treatment of whole breast (25)

Table 2:

Lower Dose Limit	Upper Dose Limit
Optimal >95% of the volume should receive 95% of the prescribed dose in the PTV **mandatory** >95% of the volume to receive 90% of the prescribed dose for PTV standard	**Optimal** <5% of the PTV volume should receive ≥ 105%, particularly in boost patients **Mandatory** <2% of the PTV standard volume should receive ≥ 107% (outside of boost area only) DMax <110% of the prescribed dose

	Lower Dose Limit	Upper Dose Limit
PTV boost	>95% of the volume should receive 95% of the prescribed dose	<5% of the boost volume should receive ≥ 107%
PTV standard – PTV boost	>90% of the volume to receive 90% of the prescribed dose	<5% of volume to receive >total dose

7.2 Dose constraints for Organs at Risk (OAR)

For field based treatment 40.05Gy in 15 fraction plan (21)

Ipsilateral lung	Maximum lung depth (MLD) below the chest wall for tangentially-opposed fields should be ≤2.5 cm for all patients, and ≤2.0cm for most patients and Ideally less than 1.5cm
Contralateral lung	Avoid irradiation
Heart	Avoid irradiation. When breath hold not possible maximum heart distance=1cm Consider shielding of heart if tumour is not shielded
Liver	Maximum distance = 1.5 cm

For volume based planning 40.5 Gy in 15# (1,22,25)

OAR	Dose Constraint
Lung	Ipsilateral Lung V18 <15% vol (idealy 12%) Acceptable up to up to 30% when treating SCF
	Contralateral lung V2.5Gy <15% ideally V2.5Gy<3%
Heart	Aim to keep maximum dose to < 30% of prescription dose, provided the coverage of PTV high risk is not compromised
	V2 <30%
	V10 < 5% (Fast Forward lymphatics protocol)
	Mean heart dose <6Gy
Ribs	Avoid dose maximum in ribs where possible
Opposite Breast	Avoided if tumour bed coverage not compromised
Brachial plexus	Maximum dose <40Gy in 2.67Gy fractions
Spinal cord	Maximum dose <37Gy in 2.67Gy fractions

For 26 Gy in 5# regimen [Ref Fast-Forward and Fast Forward lymphatics]

	Mandatory	Optimal
Ipsilateral lung	V8< 17%	V8 < 15%
Heart	V7< 5%	No dose
	V1.5 < 30%	
	Aim to keep max dose to heart < 7.8Gy provided PTV HR coverage is not compromised.	

Dose constraints for internal mammary radiotherapy (1)

OAR	Dose Constraint
Heart	V17% < 10%
	Mean heart dose < 6Gy if patient is intermediate risk
Ipsilateral lung	V17% < 35%
Contralateral breast dose	Mean < 3.5Gy

8. Planning Techniques

Standard Field Arrangements

Breast/SCF	As standard a Mono-isocentre technique will be employed. When field size limitations are exceeded a dual isocentre approach will be followed.
Breast alone	Routinely tangential pair with non-divergent back-edge, although additional field, maybe added to ensure tumour coverage
Axilla	Direct Anterior isocentric field; 6MV or 10MV if possible to cover with anterior field alone or opposing ant/post isocentric fields with 6MV or 10MV
Internal Mammary Nodes	Forward planning IMRT / Fixed field IMRT
	Inverse Planning approach

Breast Boost	3D conformal plan to achieve coverage to the boost volume and generally given as mini tangents following Adjuvant Whole Breast RT.
	SIB Use IMRT to whole breast and boost cavity using mini tangents (Forward planning IMRT).Essential to have surgical clips present for this method
	Electron boost Electron energy chosen to treat skin to chest wall distance Use ultrasound/CT measurement or clinical estimation
Plan Normalisation	
Mono-isocentre	At appropriate normalisation points based on dosimetry (100%)
Dual isocentre	At isocentre or appropriate normalisation point for tangents;
	At Dmax or, 3.0cm deep for S'Clav
	(START Trial protocol)
IMRT/VMAT	Target Median

9. Plan Evaluation

Dose uniformity reviewed in axial coronal and saggital views.

Field and OAR visualised using Beams eye view

DVH for OAR and PTV coverage

10. Verification(27–30)

Daily light field verification

The field border positions for the treatment fields would be related to the stable tattoos and isocenter verified.

Electronic Portal Imaging

Portal verification of lateral fields for conven -tional plans and for forward planning IMRT

For 40 Gy in 15 fractions : Portal verification should be weekly to give confidence that the tumour bed/quadrant area has not fallen outside the treated area.

In addition, three days in the first week to determine and allow correction for any systemic error.

For 26 Gy in 5 fractions : daily portal verification.

Displacements >4mm corrected. Apply shift to improve clinical position

For boost fractions verification of the boost field with anatomical matching.

Tolerence 4 mm

In vivo Dosimetry: Diodes if available used for Applied Dose assessment for each field first fraction, for both 5 and 15 fraction regimens.

11. Missed fractions

Two fractions may be added to the end without notification of the medical team for both 15 and 5 fraction regimens.

12. Clinical Evaluation

A standardised consent form mentioning all toxicities recommended

One clinical review during the final week of radiotherapy to assess for early toxicity is adequate unless the patient has symptoms for example, if bolus used, predict excess skin toxicity and schedule earlier clinic dates.

Assess Skin erythema, occasional moist desquamation, pigmentation and lethargy during this clinic visit.

Late effects to be assessed at later clinics include breast oedema, subcutaneous fibrosis telangiectasia, chest wall pain and very rarely rib fracture.

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The first use of Ambulatory chemotherapy infusion pumps in Sri Lanka: a brief report from Sir John Kotelawala Defence University Hospital

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Abstract

Introduction

Ambulatory chemotherapy (AC) pumps are useful for prolonged chemotherapy infusions. We report the first use of this device in Sri Lanka.

Methodology

This was a cross sectional descriptive study including all patients treated using AC pumps between August 2020 to September 2021. Data was extracted from the patient records. Simple analysis using percentages was carried out.

Results

A total of 32 patients receiving 157 infusions were included. All patients received 5 fluorouracil infusions through the AC pumps. The patients were either diagnosed with colorectal cancer or gastro-oesophageal junction tumours.

Ten percent of patients suffered subtle interruptions in infusions due to low battery of the pump. False alarms were reported only in 1.3% of patients. There were no reported cases of extravasation.

Conclusion

The usage of AC pumps for prolonged chemotherapy infusions is safe and beneficial in the Sri Lankan setting.

Key words

Ambulatory chemotherapy infusion pumps, Port A catheter, Chemotherapy

Introduction

Ambulatory Chemotherapy (AC) allows the delivery of extended chemotherapy infusions through an ambulatory pump. Patients can receive chemotherapy comfortably at home and minimise hospital stay. This approach is economical and contributes to reducing the annual health budget in a country with free health for all citizens. Appropriate patient selection is mandatory to ensure patient safety and treatment outcomes.

Historically, chemotherapy infusions were delivered as in-patients in Sri Lanka. This practice was gradually changed to the delivery of chemotherapeutics in outpatient settings. However, prolonged infusions lasting for 24 to 48 hours required inward admissions in the Sri Lankan setting.

Further, prolonged infusions restrict mobility of patients and cause inconvenience to the patient. This practice further increases the risk of thromboembolic disease.

Administration of chemotherapy outside the hospital at mobile chemotherapy units started back in 2007 in the United Kingdom.(1) Subsequently, home chemotherapy care was developed. Intravenous chemotherapy was administered at home under the supervision of a specialised Oncology nurses.

The concept of ambulatory chemotherapy pumps was developed over the last five years. A portable infusion pump, enabled patients to receive continuous infusions lasting up to seven days while freely ambulating.(2) These facilities are commonly used in resource rich settings.(3,4)

Some of the common cancers needing prolonged infusions include colorectal, head & neck cancers and soft tissue sarcomas. Published literature reports, ifosfomide, trabectidine and fluorouracil are some of the cytotoxic drugs that could be safely administered via the ambulatory pumps without the need for direct continuous medical monitoring. (5–7)

The purpose of this study is to report the experience of the usage of ambulatory chemotherapy delivery for the first time in Sri Lanka and to share relevant experience including problems encountered and safety.

Methodology

This was a cross sectional descriptive study carried out at the Sir John Kotelawala Defence University Hospital. All patients treated with continuous 5 Fluorouracil (5-FU) infusions through the ambulatory pump between 01st August 2020 to 01st September 2021 were included in the study. All data were extracted from the patients records and simple analysis was carried out.

Patients were carefully selected as this was a new experience to the staff for the AC pump administration. The inclusion criteria as follows; Patients with a WHO performance status above 01 or less, had access to mobile phones to contact the treating team in an emergency, who could access the hospital support team within 30 to 60 minutes. Patients who lived far away were requested to stay in a rented facility closer to the hospital to have treatment through the AC pump for the initial cycles.

Informed written consent was obtained for the procedure from all patients. After insertion of port A catheter, chemotherapeutic agents were administered according to protocol. In FLOT regimen Docetaxel, Oxaliplatin and leucovorin and 5 FU bolus were administered. A well calibrated AC pump was loaded with required dose of 5 FU and the dose rate was calculated. The dose rate was double checked by the pharmacist and the chemotherapy specialist nurse to minimise errors. The AC pump was positioned as per patients' preferences. The majority preferred hanging the AC pump around the neck which is shown in Figure 01. The same procedure was adapted for FOLFOX regimen as well.

The battery-operated pump was used considering the safety. The pump is equipped with alarms to notify errors such as low battery power, occlusion, faults, and air in the intravenous line (8–10)

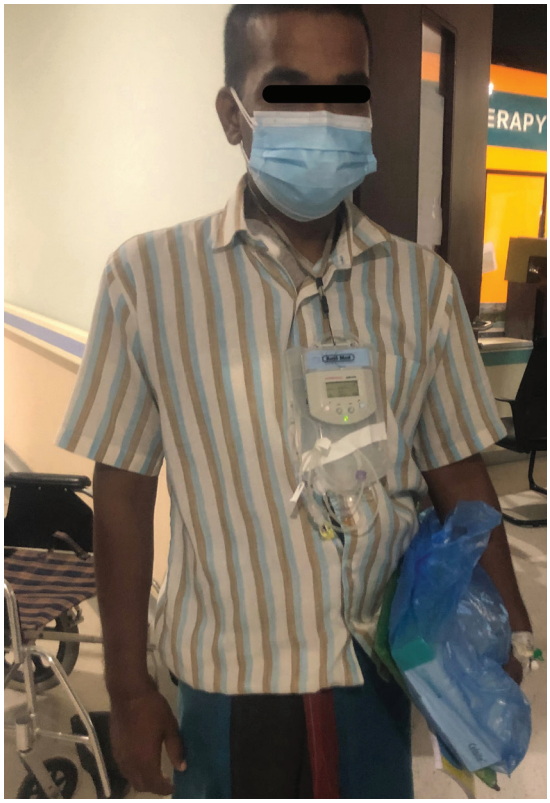

Figure 01: A patient with Ambulatory Chemotherapy pump.

No significant adverse events were reported during the very first experience of AC infusion in Sri Lanka. Those who lived more than 60 minutes away was kept inward with an AC infusion pump for the first time to recognise any possible complications and to familiarise the process to the patient.

Results

Thirty-two patients receiving 157 infusions of chemotherapy were included in the analysis. The baseline characteristics are illustrated in table 01. Majority were males. All patients received 5FU infusions as part of FOLFOX or FLOT regimen through the AC pump.

Out of 157 cycles, there were no reported cases of discontinuation of chemotherapy due to mechanical errors. The mechanical errors encountered during the usage of AC pumps are presented in table 02. However, there were 16 (10%) incidences where battery levels were not adequate for 48 hours and had to replace it while on chemotherapy and only a few minutes of infusion delay was reported.

Characteristic	Number (%)
Age (mean range)	54 years (23-68)
Gender	
Male	24 (75)
Female	08 (25)
Type of cancer	
Colorectal	30 (94)
Gastro-oesophageal junction	02 (06)
Type of chemotherapy	
FOLFOX	30 (94)
FLOT	02 (06)

Table 01: Baseline characteristic

Out of the 157 cycles of chemotherapy, there were only two (1.3%) incidences of false positive alarms. There were no reported cases of extravasation.

There were very few port related complications. Only two patients experienced PORT catheter-related complications. One patient developed a peri-portal thrombus during the 10th cycle of FOLFOX. One patient developed a port tip dislocation after the fourth cycle of FOLFOX.

Type of error	Number (%)
Low battery	16 (10)
False alarm	02 (1.3)

Table 02: Complications related to AC pumps

The chemotherapy related toxicity was considerably less and mostly grade 1 or 2 as shown in table 03. Grade 3 or 4 toxicities were not reported.

Discussion

Though the usage of AC pumps has many benefits to the patients and the health system, there can be serious complications related to the device. The literature reports many complications related The Food and Drug Administration (FDA) authority has received 56 000 reported adverse

Chemotherapy induced side effects	Number (%)
Nausea & vomiting	03 (09)
Diarrhoea	01 (03)
Neutropaenia	04 (12)
Hairloss	26 (81)

Chemotherapy induced side effects	Number (%)
Fatigue	03 (09)

Table 03: Chemotherapy related side effects

events between the years 2005 to 2009. (11) The effects of the software related complications could be detrimental leading to misinterpretation of inputs. For example, an infusion rate of 10cc per hour could be miscalculated as 100cc/hour. At the UHKDU, out of 157 times of pump usage, no reported cases of such serious adverse events. The reported incidence of false-positive alarms was only 1.3% leading to severe patient anxiety.

There are reports of erroneous flow rates, sparks, charring and shock with the usage of broken or damaged pumps due to poor maintenance. (12) Hence, regular maintenance of the device is mandatory. The FDA has published safety guidelines on proper usage of the device to ensure patient safety(13). Adherence to these guidelines is mandatory.

Regular training and education of the staff involved in the administration will help to minimize human errors. Regular quality assurance checks at multiple levels will further help in reducing errors. At our institution, a three-tier quality assurance check has been implemented to reduce human errors. The doctors, pharmacists and nurses have been trained on quality assurance to carry out the task.

Appropriate vascular access and proper selection of device will further contribute for better outcomes. Unfortunately, the literature lacks on guidance on this perspective. Hence, the practice, therefore, varies between peripherally using catheters and centrally placed catheters for ambulatory chemotherapy Infusion pumps. (14–17) At the UHKDU, central access devices have been used for all patients.

The are many limitations in establishing this practice in Sri Lanka and include the availability of the AC pump and the and the cost. From a health economics point of view, it's cost effective to use the pump and minimize hospital stay. Initiatives have been made to register the device in Sri Lanka.

Conclusion

The usage of AC pumps for prolonged chemotherapy infusions is safe and beneficial in the Sri Lankan setting.

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Dermatomyositis as a paraneoplastic manifestation of Ductal Carcinoma of breast

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Key words: *Dermatomyositis, Paraneoplastic Manifestation, Ductal Carcinoma.*

Introduction

Dermatomyositis (DM) is an idiopathic inflammatory myopathy that is characterized by distinct skin manifestations and a clinically heterogeneous collection of systemic manifestations(1). In contrast to juvenile dermatomyositis, in adults it can be a paraneoplastic manifestation(1). Paraneoplastic syndromes are rare disorders with complex systemic clinical manifestations due to underlying malignancy. DM may precede, occur concurrently or follow the detection of the underlying malignancy. We describe a case in which both Dermatomyositis and Ductal Carcinoma of the breast had their clinical manifestations developing simultaneously.

Case Report

A sixty-five-year-old unmarried female who was been evaluated for an axillary mass was referred to the dermatology unit with a generalized rash which developed over a three months period. It was itchy, scaly, erythematous with photosensitivity and commenced over the cheeks and periorbital area accompanied by eyelid edema. The changes gradually spread on to the anterior and posterior chest and upper limbs. Simultaneously the patient developed scaling on scalp and diffuse hair loss. Initially she was treated as for contact dermatitis at a local hospital. During the last month she noticed gradually worsening difficulty in rising from seated position along with difficulty in combing hair. At the same time, she developed progressive dysphagia for both solids and liquids with choking episodes.

She felt a painless lump on right axilla around two weeks after the onset of the rash but did not notice any breast lumps or nipple discharge. She developed significant loss of appetite and weight with constipation but no per rectal bleeding. She had no vaginal discharge. There were no features suggestive of other connective tissue diseases and stated her father had a throat cancer. She had preexisting dyslipidemia and diabetes mellitus.

On examination, the hair was sparse with scaling on scalp. There was periorbital oedema with violaceous hue (heliotrope rash). Face and upper trunk had confluent and reticulate violaceous erythema with scaling (V and shawl sign) (Figure 1). There was poikiloderma with erosions and ulceration over trunk with flagellate erythema (figure 2). The lateral thighs were involved with the same changes (holster sign). Her hands showed erythematous papules over the knuckles (Gottron papules) with nail fold erythema, areas of infarction and a ragged cuticle. Involvement of knees and elbows with erythematous papules were noted (Gottron sign).

The Patient had proximal muscle weakness of grade 2/5 having extensors affected more than flexors with muscle tenderness. Breast examination was unremarkable. Anterior group of right axillary lymph nodes were hard and enlarged. Other system examination was normal.

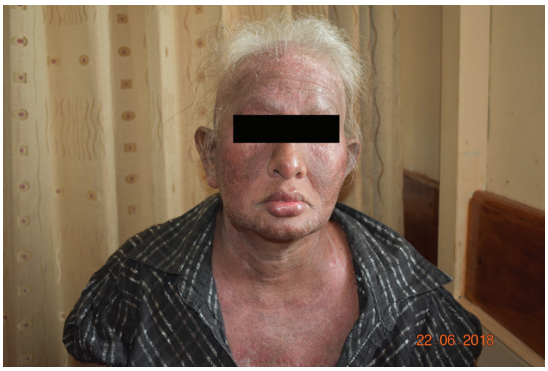

Figure 1. Periorbital oedema with violaceous hue (heliotrope rash).

The patient was being investigated for right side axillary mass. Mammogram demonstrated a malignant mass in right breast with axillary lymph nodes. Fine needle aspiration biopsy showed a malignant smear compatible with invasive carcinoma of breast.

Her Creatinine Phosphokinase was 838 U/l: Lactate Dehydrogenase was 2490 U/L: Alanine Transferase was 58 U/L in keeping with muscle involvement in DM. Ultrasound of proximal limb muscles showed active inflammation with oedema. Electro-myography was compatible with myositis. Blood picture indicated mild anemia without dysplastic white cells.

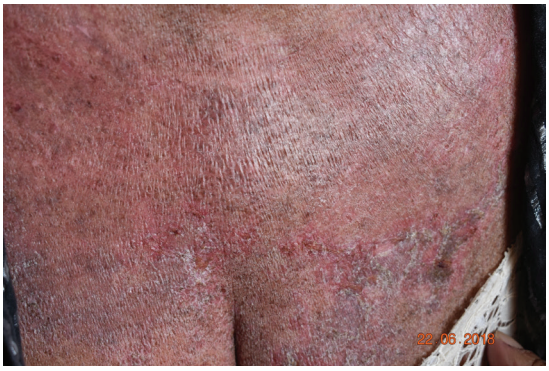

Figure 2. Confluent and reticulate violaceous erythema, scaling and poikiloderma (skin atrophy, telangiectasia with pigmentary changes).

With clinical features very much suggestive of Dermatomyositis, and with the supportive investigations, condition was diagnosed as Para Neoplastic Dermatomyositis.

The Patient was commenced on High dose Steroids (Prednisolone 1mg/kg/d) and Intravenous Immuno-Globulins (2g/Kg) infused over three days and to be repeated monthly. Topically steroids and emollients were used with sun protection. When patient became stable, she was transferred back to Cancer institute for further management.

Discussion

Dermatomyositis (DM) is an idiopathic inflammatory myopathy that is characterized by distinct skin lesions and a clinically heterogeneous constellation of systemic manifestations1. In children DM is not associated with malignancy. But in adult patients with DM, the estimated prevalence of malignancy is 20%(1). Malignancy risk is higher in males and those above 45 years(1). Paraneoplastic syndromes are rare and have complex systemic clinical manifestations due to underlying malignancy. In these patients, the malignant cells do not directly cause symptoms related to metastasis; rather they generate autoantibodies, cytokines, hormones, or peptides that affect multiple organ systems(2). Prompt recognition of these syndromes is critical as it may reveal hidden malignancy which can affect the clinical outcomes(3).

In this patient there were many typical clinical features of Dermatomyositis. Sometimes all these symptoms may not manifest together or initially, leading to diagnostic pitfalls. The pathognomonic features are Gottron papules, Gottron sign, and heliotrope rash as described in our case. Nail fold capillary dilatation, ragged cuticles, reticulate violaceous erythema over the anterior chest (V sign) and posterior chest (Shawl sign), same over the lateral thighs (Holster sign) and scalp involvement are characteristic features. Poikiloderma (Pigmentary changes, skin atrophy, telangiectasia) and periorbital oedema are compatible features. Vasculitis, ulceration, and calcinosis cutis are less common(1). Majority of these patients develop progressive proximal muscle weakness which may extend to respiratory muscles in severe cases, with elevated muscle enzyme levels and specific changes in imaging and EMG.

Symptoms of Dermatomyositis can manifest before, simultaneously or after the diagnosis of cancer. Hence it is important to be aware of them and have a high clinical suspicion. This fact is highlighted as in about one third of cases, Dermatomyositis precedes the manifestation of the underlying malignancy. In situations where DM persists, it is recommended to screen for malignancy annually for five years as the chance of detection is highest in first year and remain high for five years(1). When there is an exacerbation of DM symptoms despite treatment, repeating malignancy screening is recommended. Evaluation of myositis-specific antibodies can predict the risk of malignancy. Malignancy association is high in adults with DM who are positive for either anti-transcription intermediary factor 1 (TIF 1) or anti-nuclear matrix protein 2 (NXP 2) (1).

DM is treated with systemic steroids, other immune suppressives, Hydroxy-Chloroquine, Intravenous immunoglobulins, topical steroids, and sun protection. In paraneoplastic cases, the patient's condition will improve when the malignancy is treated.

Conclusion

DM in an adult could be paraneoplastic. Hence, a high index of suspicion is needed to screen for underlying malignancy. The treatment outcomes of paraneoplastic DM depend on the successful treatment of the underlying cancer.

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Case Report: Pineal Parenchymal Tumor of Intermediate Differentiation: A rare tumour

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Key Words: *Pineal Gland, Pineal Parenchymal Tumor, Rare tumor*

Introduction

Pineal parenchymal tumours constitute to less than 1% of all central nervous system tumours (1). Pineal Parenchymal Tumour of intermediate differentiation (PPID) is a rare tumour arising from pineal parenchyma and lies in between the spectrum of Pineocytoma and Pineoblastoma (1). PPID has been reported in all age groups, with a median age of 33 years (1) (2) and is more common in females with a male to female ratio of 1:1.5 (1) (2). We report a young man diagnosed of PPID.

Clinical Report

A 24-year-old boy presented with headache, diplopia and altered gait of seven months duration. At presentation his ECOG performance status was 1. Cranial nerve examination revealed diplopia and motor system examination demonstrated a broad-based gait. The rest of the central nervous system and the systemic examinations were unremarkable.

Magnetic resonance imaging (MRI) revealed a solid and cystic lesion measuring 2.6 cm x 3.1 cm x 2.8 cm in the pineal region. He underwent maximum safe resection of the tumor and histology, and immunohistochemistry confirmed a PPID with a mitotic Index of 2 per 10 high power field (hpf). Post-surgical MRI of the cranio-spinal axis revealed residual disease at the primary site with no evidence of drop metastasis. The cerebro-spinal fluid analysis was also normal. He was offered adjuvant radiotherapy to a dose of 54Gy in 30 fractions using intensity modulated radiotherapy technique. He had an uneventful recovery.

Discussion

The latest version of the World Health Organization classification of central nervous system tumours has subdivided pineal tumours in to 4 grades and as follows (1) (2).

Pineocytoma – Grade 1,

Pineal parenchymal tumor Grade II (mitotic figures <6 per 10 hpf)

Pineal parenchymal tumor Grade III (mitotic figure >6 per 10 hpf)

Pineoblastoma – Grade IV

This patient had PPID grade 2, given the low mitotic count.

As PPID is a newly described disease entity, there is very limited published literature on this topic. This tumor has the potential to spread through the CSF causing drop metastasis (2). Hence, staging with MRI of the craniospinal axis and CSF cytology are mandatory in making the appropriate treatment decision.

The mainstay of treatment is maximum safe surgical resection (3).The optimal management PPID is not known in unresectable cases due to the rarity of the tumor. Local recurrences have been reported even after gross total resection. Hence, adjuvant radiation is recommended even to patients who achieve maximal resection (3).

Indications for adjuvant radiotherapy following gross total resection varies widely depending on local practice. Adjuvant radiation can be considered with an aim to optimize local tumor control and may improve survival (3). This patient had a definite indication for adjuvant radiotherapy given the subtotal resection. Though there is no consensus on the dose of radiation, a dose of 50.4 – 54 Gy in conventional fractionation is considered adequate (3). Hence, we offered 54 Gy considering the young age, gross residual disease and the favorable prognosis.

Though recurrences are rare, the most common site of recurrence include the lepto-meningeal region (3,4) For patients with localized PPID, craniospinal radiotherapy can be avoided to minimize both acute and late radiation toxicity(3) (4).

Patients with lepto- meningeal involvement at diagnosis are treated as Pineoblastoma with cranio- spinal radiotherapy (3). Hence, CSF

analysis and screening cranio- spinal MRI is advisable in all patients prior to radiotherapy to exclude lepto-meningeal involvement(3) (4). This patient was treated with localized radiotherapy as the CSF cytology and MRI craniospinal axis did not reveal dissemination.

The role of chemotherapy remains controversial and not routinely recommended in adjuvant setting(5)

The prognosis of PPID is excellent with an overall survival of 14.5 years and progression free survival of 5.4 years for PPID (3)

Conclusion

The PPID is a very rare disease which could affect young people. Maximum safe resection of primary tumor is the main stay of treatment. The extent of radiation depends on the extent of the disease. Localized disease could be treated with adjuvant radiotherapy to the local site to reduce local recurrences. Long term follow up is recommended to detect late recurrences and to monitor chronic radiation toxicity.

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A case report of an ovarian cancer patient with end-stage renal failure treated with Carboplatin

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Keywords: *Ovarian cancer, end stage renal failure, dialysis, carboplatin*

Introduction

The treatment of ovarian cancer includes maximum debulking with neoadjuvant or adjuvant chemotherapy. Platinum based chemotherapy such as cisplatin and carboplatin are the key cytotoxic chemotherapeutics used in the treatment. Unfortunately, these drugs are nephrotoxic, and the renal functions should be reasonable to administer these drugs. Treating patients with ovarian cancer and renal impairment could be challenging.

We report a case of a middle-aged woman with ovarian cancer and end stage renal failure who was treated with carboplatin and regular haemodialysis.

Case report

A 53-year-old post-menopausal woman with a background of chronic renal parenchymal disease on haemodialysis, presented with abdominal distention of 03 months with vomiting for one month duration. Examination revealed a vague abdominal mass with minimal ascites. The rest of the clinical examination was unremarkable. The Ca-125 was 235 U/ml and ultrasound scan of the abdomen revealed a right ovarian neoplasm with bilateral chronic renal parenchymal disease. The staging CT scan of the chest, abdomen and pelvis revealed a large pelvic mass measuring 12 x 7.2 x 10.6cm with cystic and solid components with minimal ascites. There was no evidence of spread beyond the ovary. She underwent debulking surgery and the histology confirmed a poorly differentiated high grade serous carcinoma FIGO stage IIB. Her full blood count and liver functions were within normal limits, but the serum creatinine was 4mg/dl with an estimated creatinine clearance of 8.3ml/min. Considering her age and the preference, it was decided to offer her adjuvant single agent carboplatin. The dose was calculated based on the Calvert formula for Area Under Curve (AUC) 5 minutes mg/ml, with the GFR as 0 (1). The calculated dose of carboplatin was 125mg which was administered, and dialysis was initiated within 16 -24 hours after the chemotherapy. Thereafter, the patient underwent dialysis every 3rd day until the next cycle of chemotherapy. The carboplatin was repeated every 3 weeks and she completed 5 cycles of chemotherapy. There was neither improvement nor worsening of the creatinine clearance during the treatment. She later recurred and succumbed to the illness 12 months after completing the treatment.

Discussion

The prevalence of cancer has increased in patients with chronic renal failure due to various contributing factors (2). Treating such patients with cytotoxic chemotherapeutic agents could be challenging.

In cancer therapy, the choice of the anticancer drug in each patient follows multiple rules and criteria, for example, indications and protocols. It may not be always possible to avoid using potentially nephrotoxic drugs. However, it remains very important to be aware of the renal function of patients who receive potentially nephrotoxic drugs. If a nephrotoxic prescription is mandatory, and there is no other, better tolerated alternative, means of prevention of renal toxicity should be used together with the elimination of potential risk factors for renal toxicity. (3).

Platinum based derivatives such as carboplatin and cisplatin are the drugs of choice for treating ovarian cancer. Carboplatin and paclitaxel combination is the best recommended first line treatment in the neoadjuvant or adjuvant setting for locally advanced ovarian cancer (4). The kidneys are the major elimination pathway for both carboplatin and cisplatin and their metabolites.

Prescribing to patients on dialysis should be done cautiously. It needs dose adjustment to prevent

overdosing and toxicity. Further, drug clearance with dialysis must be considered to choose the optimal timing of chemotherapy

Until recent years, patients with end stage renal failure and ovarian cancer were mostly opted out of treatment due to the high renal toxicity of the chemotherapy drugs. Various protocols have been tried along with dialysis to make treatment possible for these patients.

The exogenously administered platinum agents remain in both protein-bound, and unbound forms. The unbound form is the active form which could be removed by dialysis. Carboplatin is much less reactive and unlike cisplatin it remains mostly in the unbound form in the plasma. Hence, the pharmacokinetics of carboplatin makes it more suitable for usage in patients on dialysis. Further, carboplatin is relatively less nephrotoxic than cisplatin.

In routine clinical practice, the Calvert equation has been used to calculate the carboplatin dose where the renal function is inherently adjusted: Dose (mg) = (GFR+25) x AUC. An AUC of 5 -7 is used in patients with normal renal functions. There is conflicting evidence for carboplatin dose calculation in patients on dialysis. The literature reports the used Calvert formula even in patients with renal dysfunction and on dialysis (5). The commonly reported practice is to consider the GFR as 0 (1). Hence, we used the same method to calculate the dose for our patients.

The timing of the dialysis after carboplatin remains controversial. However, the timing is crucial as performing it early may reduce the efficacy of the drug and delaying it may attribute to systemic toxicity. It has been estimated that 15-20% of carboplatin could be removed by performing haemodialysis with the first 24 hours (6). Different timings have been reported in the literature. Watanabe et al. has reported that dialysis after 1.5 hours of carboplatin administration has reduced the plasma levels significantly and after 16 hours had been reasonably safe and tolerable, producing durable responses (5). Hence, we commenced the first dialysis 16 hours after the chemotherapy. We administered the chemotherapy in late afternoons of the non-dialysis day and dialyzed the patient the following morning which seemed feasible in our set up.

In this case, the patient adhered to the treatment optimistically and was able to complete her chemotherapy whilst experiencing improved quality of life.

Conclusion

Patients with ovarian cancers in a background of chronic renal failure could be treated with the carboplatin and optimal dialysis to improve the quality of life.

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Scapular Bone Metastasis as the initial presentation of Hepatocellular carcinoma: a case report.

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Key Words: *Hepatocellular Carcinoma, Bone metastasis, rare presentation*

Abstract

Extra-hepatic spread is present in 5% to 15% of patients with hepatocellular carcinoma (HCC) at the time of diagnosis. (1) The most frequent sites are lung and regional lymph nodes with few cases reported with bone metastasis. (2)

Here, we report a case of unsuspected HCC with symptoms due to scapular bone lesion as the initial presentation. Bone biopsy was obtained and the diagnosis of a deposit of a Hepatocellular Carcinoma was made. The patient was treated with radiotherapy and Tyrosine Kinase Inhibitor (TKI) – Sorafenib.

Introduction

Hepatocellular carcinoma is the 6th common cancer and the 3rd common cause of death due to cancer worldwide in 2020. (3)Increased incidence of HCC could be due to the increasing incidence of liver cirrhosis or Chronic liver disease. Frequent sites of metastasis include lung and lymph nodes. (2)We report a rare occurrence of asymptomatic HCC with scapular deposit and no other metastatic sites.

Case Report

A 68- year -old gentleman was investigated at the surgical clinic for a progressively enlarging scapular lesion for six months duration. Further investigation with a contrast enhanced computer tomography (CECT) showed a large enhancing mass (10.5 x 17 x15 cm) in the shoulder region with destruction of the right scapula (Figure 01) with differential diagnosis of secondary metastatic deposit. Further imaging showed a focal lesion of 9.6x9.2 cm (Figure 2) in a non-cirrhotic liver with few non-specific nodules in the lungs. (Fig.1&2).

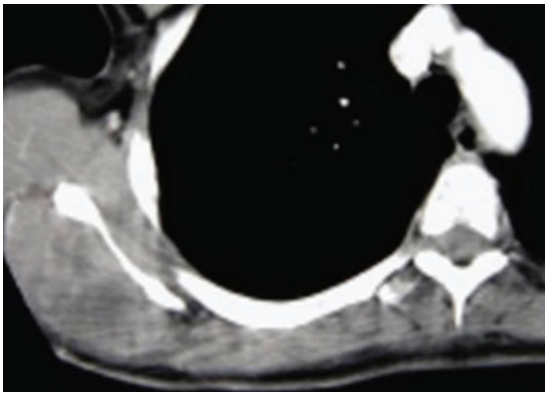

Figure 1 Computer Tomography image showing Scapular metastasis

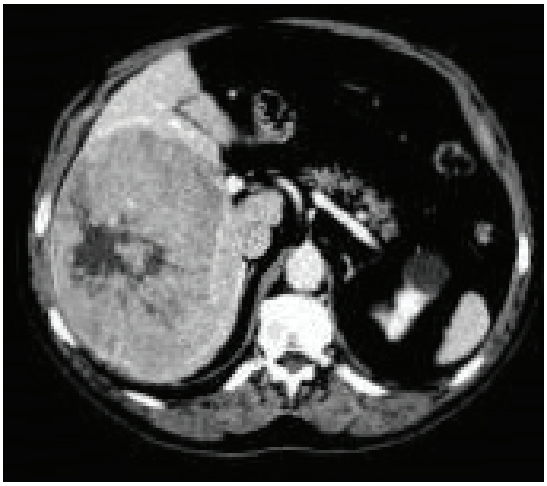

Figure 2 Computer tomography image of liver lesion

He gives no history suggestive of causes that can lead to chronic liver disease and is a nonsmoker.

Initial clinical examination revealed a left scapular region mass without any restriction of movement which eventually became painful. Patient's body mass index was normal and had good performance status.

The patient's laboratory studies showed: hemoglobin (Hb) concentration, 10.0 g/ dL; creatinine serum concentration, 1.2 mg/dL; ALT, 196 U/L; AST, 325 U/L; alkaline phosphatase

(ALP), 1,890 lU/L; gamma-glutamyl transferase (GGT), 64 lU/L; bilirubin 1.3mg /dl; INR 1.1 and lactate dehydrogenase (LDH), 956 lU/L. Hepatitis screening was not performed due to financial constraints.

Patient underwent incisional biopsy of the lesion at scapular region and an image guided biopsy from liver.

The pathology report showed that both biopsies were positive for the hepatic marker HEPAR-1, indicating that they had originated from the HCC of liver (Fig.3).

Serum alpha feto protein was >2000 ng/ml.

Due to the elevated liver enzymes, an upper GI Endoscopy was performed to exclude varices and bleeding.

This patient was discussed at the Multi - Disciplinary Meeting (MDT) and the recommendation was to offer palliative radiotherapy for scapular lesion as the patient was symptomatic and to start on sorafenib to control the progression of liver lesion.

After radiotherapy (30 Gy in 10 fractions) and 5 months of sorafenib (400 mg twice daily), the patient improved symptomatically and decline of liver enzymes were also noted.

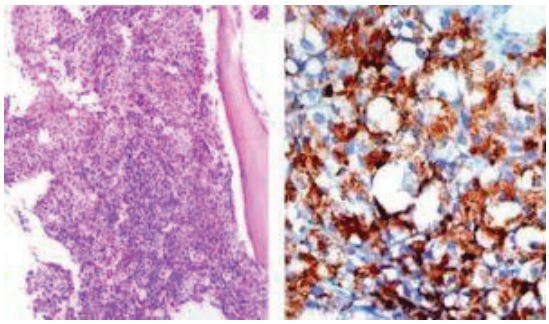

Figure 3 metastatic scapular deposit with HEPAR – 1 positivity

Discussion

Hepato Cellular Carcinoma (HCC) is the most common primary tumour of the liver and is closely associated with chronic liver disease. (4) Even though it has a male propensity, an increasing incidence of Non-Alcoholic Steatohepatitis (NASH) associated with metabolic disorders and obesity has greatly increased the number of female patients presenting with hepatoma or hepatocellular carcinoma. (5)

Unfortunately, early stages of HCC are largely asymptomatic. Most patients present in an advanced disease stage like the patient in discussion. Skeletal metastasis of HCC occurs less frequently compared with other cancers and is considered a rare primary form of presentation. (6) As in the present case, scapular metastasis appears to be a unique way of haematogenous metastasis of HCC because it had occurred before clinical manifestations of liver pathology and is the first clinical sign of presentation. The pulmonary and prevertebral circulation has been suggested to be the main route of metastasis to the skeletal system(7). In a few reported cases, most skeletal metastasis was seen in the vertebra, ribs and skull. (1)

Because radiation therapy can easily palliate symptoms of bone metastasis, it is an important part of multimodal treatment of hepatocellular carcinoma with bone metastasis (8).

Even though it is one cancer that can be diagnosed without a biopsy (9), in cases where liver lesion is not the initial presentation, the combination of histology with immunohistochemistry and serum alpha feto protein level is important in distinguishing it from other differential diagnosis of secondary deposits.

An advanced stage is associated with poor survival with limited treatment options even in this modern era. For years, sorafenib a Tyrosine kinase inhibitor was the only treatment available for this advanced disease but now the advances made in targeted immunotherapy demonstrates non inferiority to sorafenib and median survival has improved significantly (10). Most recently, immunotherapy with checkpoint inhibitors (CPIs) have demonstrated promising results where improvement in quality of life and treatment responses were observed(11). Therefore, early recognition and initiation of palliative symptom care along with radiotherapy and some form of definitive treatment for HCC has shown benefit for patients within this category. (12)

Conclusion

This case highlights that a patient with asymptomatic hepatocellular carcinoma can present with a bone metastasis as the initial presentation.

Ethical Consideration:

Informed Consent was obtained directly from patient.

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