

RAY of HOPE

Vol-02 Issue No-3 | Date: 7th September, 2019



LEADER IN HEALTHCARE



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Dr. BS Ajaikumar | Chairman & CEO | HCG Group

Greetings from HCG!

It gives me great pleasure to take our readers through few of the case studies that showcase the fact that right expertise in alliance with state-of-the-art technology, can achieve desired outcomes and quality of life for our patients.

As a leader in healthcare, we would like to reiterate, that it is our duty to educate, inform the patient about the disease, and explain to them with patience, using the appropriate terminologies. The aim should be to make them aware of the treatment and the outcome in order to eliminate the fear.

At HCG, we take efforts to delve into complicated cases and deliver quality treatment. While we may not cure diseases all the time, we have made it possible to survive by adding more life to years. In due process, we are proud to achieve a better lifestyle for our patients.

Until next time, I wish you good health!

CONTENTS

PAGE NO. 3
DYNAMIC MANOEUVRES ON MRI IN
ORAL CANCERS - MAKING INVISIBLE- VISIBLE

PAGE NO. 5
METASTATECTOMY FOR OVARIAN CANCER
IN AN OPERATED CASE OF CARCINOMA BREAST:
A RARITY IN IT'S ENTIRETY

PAGE NO. 6
ACHIEVING MOTHERHOOD
AFTER MALIGNANCY

PAGE NO. 7
FERTILITY AFTER GYNEC CANCER

PAGE NO. 8
GENETIC COUNSELLING AND TESTING IN HEREDITARY
COLORECTAL CANCERS: A STEP AHEAD ROLE IN
EARLY DETECTION, PREVENTION AND MANAGEMENT

PAGE NO. 9
ACCELERATED PARTIAL
BREAST IRRADIATION (APBI)



DYNAMIC MANOEUVRES ON MRI IN ORAL CANCERS – MAKING INVISIBLE- VISIBLE

Dr. Diva Shah | Consultant - Radiology | HCG Cancer Centre, Ahmedabad

Clinical examination and bimanual palpation are corner stone in assessing small oral cavity malignant lesions, leukoplakia, and any dysplastic lesions.

During imaging of oral cavity lesions, it is important to determine the space from which the tumour is originating, size, trans-spatial extension and it's invasion of deep structures.

Small oral cavity tumors are real imaging challenge, and such tumors are inadequately evaluated due to apposed mucosal surfaces of the oral cavity, metallic denture artifacts, sub-mucosal fibrosis which acts as a major hinders in evaluation.

Dynamic manoeuvre in CT imaging of oral cavity lesions are well known established technique, but it has limitations in evaluation small oral cavity lesions, particularly patients with submucosal fibrosis, retro-molar trigone lesions , evaluation of post-operative oral cavity and problems in evaluating oral cavity lesions and their true extent due to dental streak artifacts and inadequate contrast as well as spatial resolution.

MRI in these circumstances scores over CT and is a preferred modality with excellent soft tissue contrast resolution. The purpose of this article is to show a benefit of various dynamic manoeuvre in pre and post contrast MRI sequences which serves as key sequences and it helps either 'rule in' small lesions or 'rule out' tumor extensions and we are using in day to day practices in all head and neck patients.

1) Manoeuvre – 1 Puff Cheek Manoeuvre

Puffed cheek MR manoeuvre is performed by asking the patient to blow mouth uniformly through pursed lips. This



(Figure 1)

Puff cheek manoeuvre in axial T2W images depicts normal MR anatomy of the oral vestibule

technique can be optimized by asking the patient to move the tongue away from the hard palate and the teeth.(Figure 1)

This manoeuvre can easily be adopted by the patient, and

add a negligible amount of time on total MRI scan time. The buccinator muscles are better seen on puffed-cheek images than on the conventional MRI scans , thus rule in or rule out tumour extensions and depth of muscles .

It is helpful in the evaluation of small primary buccal mucosa lesion involving anterior buccal mucosa, anterior part of upper or lower GB sulcus, angle mouth/vestibule. Small submucosal



(Figure 2A)

(Figure 2B)

Post contrast T1FS image showing small nodule near right upper GB sulcus, while post contrast MRI with puff cheek Manoeuvre shows a well defined peripherally enhancing submucosal nodule near parotid duct opening and upper GB sulcus is uninvolved.

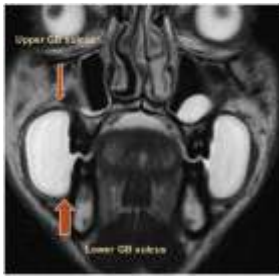
lesions are well delineated (Figure 2-A& B) This manoeuvre helps in delineate extent, mucosal and sub-mucosal spread, buccinator involvement and rule out/ rule in outer gingival / alveolar mucosal involvement. Such precise extent and right anatomic relationship help surgeon for minimal invasive surgery, less post-operative defects, thus avoid extensive flap reconstruction and disabilities to the patient.

This manoeuvre has limitations in patients with severe sub-mucosal fibrosis, evaluation of posterior GB sulcus & RMT lesions and in post-operative patients with large flap reconstruction for oral cancers which does not allow proper distension of oral cavity.

2) Manoeuvre – 2 Water distension of oral vestibule

This manoeuvre is performed by distension of oral vestibule by asking the patient to drink 20-40 cc of plain water. This manoeuvre aids an excellent natural contrast between oral cavity proper/lesion and adjacent normal buccal mucosa and other anatomic structures on T2W & post contrast T1W FS MRI sequences. (Figure3)

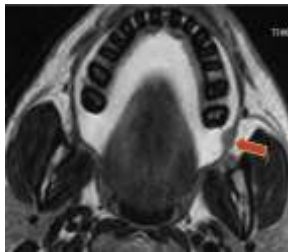
The manoeuvre can optimally distend the oral vestibule. As water retains in RMT region in dependent position during MRI study, it helps in distension of posterior (dependent) aspect



(Figure 3)

Water Distension Manoeuvre
Distension of vestibule with water on coronal T2 images shows upper and lower GB sulci and normal hard palate mucosa.

upper and lower GB sulci and RMT which is not well evaluated with puff cheek technique. Water distension is extremely helpful in a patient with severe submucosal fibrosis, evaluation of small posterior buccal mucosa and RMT region tumors. (Figure 4-A,B) The natural contrast created by water



(Figure 4A)

Well differentiated SCC of left posterior buccal mucosa, Axial T2W image with water distension show small irregular lesion of posterior buccal mucosa, no deeper extension in pterygomandibular raphe. Clinical image of left posterior buccal mucosa lesion



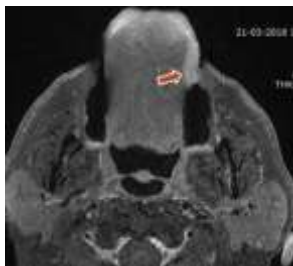
(Figure 4B)

also delineates inner alveolar mucosa, thus rule in or rule out alveolar mucosa involvement and extension of anterior and inner buccal mucosa lesion into the floor of the mouth.

3) Manoeuvre– 3 Tongue Protrusion

Small tongue lesions along the lateral and ventral surface of tongue are challenging to assess due to close apposition of soft tissue at rest and artifacts generated by dental amalgams. This manoeuvre is performed by asking the patient to protrude the tongue.

This is a useful additional manoeuvre along with conventional MRI sequences for small tongue lesion along



(Figure 5)

Small malignant ulcer (MDSCC) along left lateral and ventral aspect tongue, Post contrast T1WFS image with protrusion of tongue show enhancing lesion along the left lateral margin.

the lateral and ventral aspect of anterior tongue or lesion involving tip (apex) of the tongue. (Figure 5)

4) Manoeuvre– 4 Open Mouth technique

Evaluation of small hard palatal and soft palatal mucosa is very challenging, and it is difficult to evaluate with conventional MRI technique, also difficult with patients who are operated multiple head and neck primary lesions with distortion of normal anatomy of oral cavity and associated post radiation changes.



(Figure 6A)



(Figure 6B)

Ulcer in the palate in k/c/o Ca. Central Arch Alveolus Sagittal post contrast T1FWS image with open mouth manoeuvre shows an irregular hypo enhancing superficial lesion involving a posterior aspect of hard palate and junction of the soft palate.

An open mouth is a useful manoeuvre for evaluation of small lesions of hard palate / soft palate mucosa. Delineate exact depth of the lesion, extent and involvement of upper alveolar mucosa, RMT and adjacent GB sulcus easily or secondary involvement of palate in primary upper alveolar lesions. (Figure6)

To conclude,

- Dynamic manoeuvre are simple and easy with short duration MR sequences.
- They overcome the limitations of conventional CT scan and conventional MRI imaging for evaluation of small oral cavity lesions and provide more detail and specific information to surgical oncologist for exact margins and better oncoplastic reconstruction in the era of minimal invasive surgery.
- Use of dynamic manoeuvre in MRI helps either 'rule in' small lesions or 'rule out' tumor extensions in lesions of the oral cavity.
- Such dynamic manoeuvre should always be incorporated in routine clinical MRI practice for evaluation of oral cavity lesions by radiologist.

ABBREVIATIONS

- RMT- Retromolar trigone
- GB-Gingivo-buccal sulcus
- CT scan-Computed Tomography
- MRI-Magnetic resonance imaging
- MDSCC- Moderately differentiated squamous cell carcinoma



METASTATECTOMY FOR OVARIAN CANCER IN AN OPERATED CASE OF CARCINOMA BREAST: A RARITY IN IT'S ENTIRETY

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A 35-year-old female patient presented to HCG Cancer Centre, Ahmedabad with complaint of lump in the right breast. She was investigated, and the biopsy revealed an Infiltrating Ductal Carcinoma. She underwent Right Modified Radical Mastectomy in November 2010. Final biopsy report showed a stage IIA cancer (pT2N0Mx). Her IHC report showed a favourable biology, i.e ER/PR was positive, and her2-neu was negative. She was given 6 cycles of adjuvant chemotherapy and later was started on hormone treatment with T. Tamoxifen (20 mg) once daily since she was premenopausal.

She was on regular follow up. After a year of surgery, she underwent metastatic workup, which showed a mass in the right adnexa with cystic spaces within. She was further evaluated with CT scan of the abdomen which showed a large 98*91*75 mm mass. PET scan was done to rule out metastatic disease at other sites and it was normal except for ovarian disease. In view of oligo-metastatic disease and young age of the patient, decision was taken for surgery and she underwent Bilateral Oophorectomy with hysterectomy along with excision of omentum and regional pelvic nodal dissection. Histopathological examination showed a metastatic adenocarcinoma in the right ovary with normal opposite ovary and uninvolved lymph nodes. Her postoperative course was uneventful and she was then

started on T. Letrozole (2.5 mg).

This is a rare and unusual case of breast cancer metastasising to the ovary. Literature shows that patients are predominantly young at diagnosis and majority of them are premenopausal. The most common site of primary cancer in case of ovarian metastasis is 1. Colorectal, 2. Gastric and 3. Breast. Colonic cancer is more likely to spread to the ovaries than the rectum (1).

Breast cancer frequently spreads to the bone and at times to the lungs and liver. We at our centre have performed pulmonary metastasectomy and liver resection for patients with oligometastatic disease with good outcomes following the same.

The patient has been regularly followed up with screening mammograms, ultrasound and chest x-ray and is free of disease at present.

Reference 1: Ovarian metastases resection from extragenital primary sites: outcome and prognostic factor analysis of 147 patients

Reference 2: Wenhua Li, Huaying Wang, Jian Wang, Fangfang LV, Xiaodong Zhu and Zhonghua Wang

Reference 3: BMC Cancer 2012;12:278

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ACHIEVING MOTHERHOOD AFTER MALIGNANCY

Dr. Kalpana Kothari | Consultant - Gynec Oncology | HCG Cancer Centre, Ahmedabad

This is about a 24-year-old lady who was treated for Ovarian Cancer in 2013 and is now a mother of 3 year-old twin boys.

She presented to us in November 2013 with a complaint of fullness in the abdomen and decreased appetite. She had abdominal tumors on examination. (Tumour markers for Ovarian Cancer) CA 125 was raised and CT scan showed large ovarian mass compressing urine pipe (Ureter) and stool passage (rectum). The patient and her relatives were counselled regarding the need for surgery and its consequences. She underwent ureteric stenting followed by removal of both ovaries containing tumor. The tumors were sent for reporting intra operatively which showed borderline ovarian tumour so other tissues show, where cancer could spread were also removed. Since the uterus

was normal, it was preserved so that she could get pregnant in future with in vitro fertilisation. She recovered well after surgery. Her final histopathology reports confirmed borderline ovarian tumors and disease limited to ovaries. After few years the patient gave birth to twin boys with infertility treatment.



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FERTILITY AFTER GYNEC CANCER

Dr. Swati Shah | Consultant - Gynec Oncology | HCG Cancer Centre, Ahmedabad

This is a description of a 30-year-old lady who was treated for Gynec Cancer two years back and now gave birth to a baby. In June 2016, she was being evaluated for infertility, but her Sonography showed suspicious cyst in her right ovary. She was further investigated for cancer markers, but CT scan suggested doubtful cyst in the right ovary and bulky left ovary. She underwent Laparoscopic removal of cysts from both ovaries. The histopathology of both ovaries revealed borderline papillary Cystadenocarcinoma. Then she presented to us for further management. Her clinical and radiological evaluation was done which suggested that there was no spread of cancer.

Borderline papillary serous Cystadenocarcinoma is a less aggressive type of cancer but can spread to other tissues in the abdomen. As the patient was keen to preserve fertility, a combined decision was made to do fertility preserving cancer surgery. The patient and her family were counselled that the ovaries and other tissues where the cancer can spread to have to be removed, while her uterus can be preserved if it appears normal. With In vitro fertilization treatment, she would be able to conceive and give birth to a child in future.

She underwent surgery in September 2016, which included removal of both ovaries, fallopian tubes, posterior peritoneum, Bilateral pelvic lymph nodes and infracolic omentum. Uterus was preserved, as it appeared normal. She recovered well and was discharged in 5 days.

Her final histopathology showed residual disease in both ovaries but no spread to other tissues. So she was advised to plan IVF pregnancy with proper follow up with infertility

specialist and us. It is a pleasure to see that she gave birth to a healthy baby in 2019 and is in good health. Moreover, it is a satisfaction to see that a cancer patient is leading a quality life and could give birth to yet another life.



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- Less scarring

Robotic Assisted Surgery can be used in:

- Urological Cancer
- Gynaecological Cancer
- Gastrointestinal Cancer
- Head and Neck Cancer
- Thoracic Cancer

RAY of HOPE

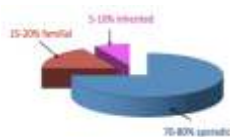


GENETIC COUNSELLING AND TESTING IN HEREDITARY COLORECTAL CANCERS: A STEP AHEAD

ROLE IN EARLY DETECTION, PREVENTION AND MANAGEMENT

Dr. Mansi Vishal | Genetic Counsellor | HCG Cancer Centre, Ahmedabad

About 5-10% of all cancers are hereditary. More commonly seen are colorectal, breast, ovarian, bowel and pancreatic cancers. Hereditary cancer syndromes are a spectrum of disorders in which genetic mutation in one single gene can cause cancer of different organs in different family members. However, due to less awareness and other unidentified factors, it goes unnoticed. Genetic counselling and testing is being more widely recognized which can help in early detection, prevention and management of cancer.



Lynch syndrome or Hereditary Non-polyposis Colorectal Cancer (HNPCC) is one of the most common hereditary colorectal cancer syndrome which is caused due to germline mutations in mismatch repair (MMR) genes namely *MLH1*, *MSH2*, *MSH6*, *PMS2* and

EPCAM. It is associated with increased risk of colon, rectum, gastric, ovarian, endometrium and other rare cancer subtypes. Other hereditary colorectal cancer syndromes are Familial adenomatous Polyposis (FAP), MUTYH-associated polyposis and PTEN-Hamartoma syndrome. These are caused by mutations in other respective genes.

Case report of Lynch syndrome

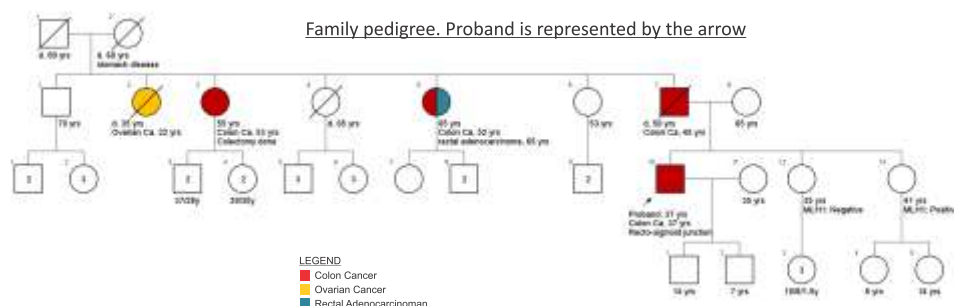
A 38-year-old patient presented with well-differentiated adenocarcinoma of recto-sigmoid region of colon. His biopsy sample was sent for mismatch repair testing in which staining of *MLH1* and *PMS2* proteins were absent. He underwent surgery for removal of part of his colon. After surgery, he was referred for Genetic counselling for detailed genetic evaluation. His family history revealed the following his father died of Colon Cancer at 50 years of age with age at diagnosis being 45 years. His paternal aunt also got diagnosed with colon cancer at 53 years of age for which colectomy was done. Another paternal aunt died of Stomach Cancer at 35 years of age. Based on significant clinical, family history and results of MMR testing, Lynch syndrome was suspected. Therefore, a germline genetic testing panel for colorectal cancer from his peripheral blood was recommended. Report revealed that he was born with a pathogenic variant in *MLH1* gene. *MLH1* is a mismatch repair gene which has an essential role in DNA repair. This confirms the genetic diagnosis of **Lynch syndrome**.

Germline pathogenic variants in *MLH1* gene has been shown to be associated with Lynch syndrome, which increases the risk for Colorectal Cancer (22-74%), small Bowel Cancer (4-12%), endometrial cancer (14-54%), Ovarian Cancer (4-20%) and Gastric Cancer (0.2-13%) over

general population risk. In the post-test counseling session, further surveillance was suggested to him which included annual colonoscopy for colorectal cancer and annual urinalysis for risk of other cancers as per NCCN guidelines. There is no clear evidence to support screening for gastric, duodenal, and small bowel cancer for individuals with Lynch syndrome. Selected individuals or families who have a history of these cancers or those of Asian descent may benefit from surveillance. If surveillance is performed, physicians may consider upper esophagoduodenoscopy (EGD) extended to the distal duodenum or into the jejunum every 3 to 5 years starting at age 30-35 years. Consider testing and treating *H. pylori*, if detected.

Lynch syndrome is inherited in an autosomal dominant manner which means that one non-working copy of the gene is sufficient to cause the disease. Therefore, there is 50% probability for the inheritance of this pathogenic mutation in patient's siblings and also, to pass it on to the next generation. Therefore, mutation specific test (MST) was recommended in both of his sisters and in patient's sons at 18 years of age. Test result of the elder sister came positive for the same familial mutation in *MLH1* gene. Her risk of getting colon and endometrial cancer was calculated to be ~30.2% and ~43.2% respectively. Based on NCCN guidelines, prophylactic hysterectomy and prophylactic salpingo-oophorectomy were suggested as an option to her since she has completed child bearing. Screening for endometrial and ovarian cancer was suggested by endometrial biopsy, transvaginal ultrasound and serum CA-125. Annual colonoscopies and urinalysis was suggested for colon cancer screening.

In conclusion, the underlying cause of cancers in the family has been identified with help of next-generation germline genetic testing. Mutation specific test (MST) helped in identifying the future risk in the unaffected family members. Pre-test Genetic counselling was done for understanding the advantages and implications of doing a genetic test in the patient. Detailed post-test Genetic counselling was offered to the patient and the family members for correct explanation of the complicated genetic test results and for surveillance options. The advantage of Genetic counselling was that detailed family history helped the geneticist and the clinician chose for the right genetic test panel for the patient.





ACCELERATED PARTIAL BREAST IRRADIATION (APBI)

Dr. Maitri Gandhi | Consultant - Radiation Oncology | HCG Cancer Centre, Ahmedabad

BREAST CONSERVATION THERAPY (BCT) FOR EARLY STAGE BREAST CANCERS

- US National Institute of Health released a consensus statement, recommending breast conserving treatment as the preferable option for women with early-stage breast cancer
- Based on 6 RCT and meta-analysis it was shown that RT is an integral component of Breast Conservation therapy (BCT)

However,

- Despite the advantages of BCT, its utilization remains a problem
- It has been reported that many women who are candidates for BCT do not receive it, only 10% to 80% of patients actually receive it
- In addition 15% to 30% of patients who undergo lumpectomy do not receive radiation therapy

WHY IS BCT NOT UTILIZED COMMONLY?

- Commitment to usual 6-7 week course of adjuvant conventional radiation therapy
- Convenience, Access
- Cost
- Distance from the radiation therapy facility
- Lack of transportation
- Lack of social support structure
- Poor ambulatory status of the patient
- Physician bias
- Patient age
- Fear of radiation treatments
- Lack of adequate radiation resources

HENCE, THE QUESTION ARISES....

‘Can similar rates of local control be achieved with radiation therapy delivered only to the area at highest risk for recurrence?’



If so, radiation could be delivered in a significantly shortened period, thereby potentially making the BCT option available and attractive to more women



This is the concept of accelerated partial breast irradiation (APBI)

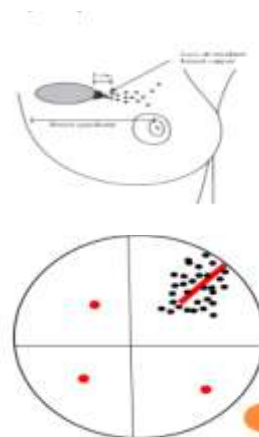
WHAT IS APBI?

APBI is an approach that treats only the lumpectomy bed plus a 1-2 cm margin, rather than the whole breast.

By increasing the radiation fraction size and decreasing the target volume, this technique allows the treatment to be accomplished in a shorter period.

RATIONALE FOR APBI

- Ipsilateral breast tumor recurrences (IBTR) develop in and around the tumor bed in 44%-86% of cases, and treatment to the whole breast may be unnecessary.
- By focusing the radiation to the area of potential recurrence, much of the surrounding tissues could be spared, reducing toxicity and improving cosmetic outcome
- A shorter radiation treatment course, given at higher dose per fraction, could achieve the same therapeutic effect as a longer treatment course, given at lower dose per fraction, based on the concept of radiobiologic equivalence



APBI TECHNIQUES

- Multi-catheter interstitial brachytherapy
- Balloon catheter brachytherapy
- External Beam radiation therapy (3D-CRT, IMRT)
- Intraoperative radiation therapy (IORT)
- ✦ The treatment consists of 10 fractions BID for 5 days for the first 3 techniques, whereas IORT is delivered as a single fraction after surgery in OT

PATIENT SELECTION CRITERIA

Patient selection is critical to the successful application of APBI

Various societies have now published recommendations of patient selection criteria for APBI. These include:

- American Society of Breast surgeons (ASBS)
- American Brachytherapy Society (ABS)
- American Society for Radiation Oncology (ASTRO)
- European Society for therapeutic Radiology and Oncology (ESTRO)

Recent Astro Updates for Patient Selection

76 C. Correa et al

Practical Radiation Oncology : March - April 2017

Table : Comparison of Patients groups in original and updated consensus statements

Patient group	Risk Factor	Original	Update
Suitability	Age Margins T stage DCIS	≥ 60 y Negative by at least 2 mm T1 Not allowed	≥ 50 y No change Tis or T1 If all of the below : ● Screen - detected ● Low to intermediate nuclear grade ● Size ≤2.5 cm ● Resected with margins negative at ≥ 3 mm
Cautionary	Age Margins DCIS	50-59 y Close (> 2 mm) ≥ 3 cm	● 40 - 49 y if all other criteria for "suitable" are met ● ≥ 50 y if patient has at least 1 of the pathologic factors below and does not have any "unsuitable" factors Pathologic factors : ● Size 2.1 - 3.0 cm (a) ● T2 ● Close margins (<2mm) ● Limited / focal L VSI ● ER (-) ● Clinically unifocal with total size 2.1-3.0 cm (b) ● Invasive lobular histology ● Pure DCIS ≥ 3 cm if criteria for "suitable" not fully met ● EIC ≥ 3 cm No change ≥ 3 cm and does not meet criteria for "suitable"
Unsuitable	Age Margins DCIS	<50 years Positive ≥ 3 cm	● <40 y ● 40 - 49 y and do not meet the criteria for cautionary No change No change

(a) The size of the invasive tumor component.

(b) Microscopic multifocality allowed, provided the lesion is clinically unifocal (a single discrete lesion by physical examination and ultrasonography / mammography) and the total lesion size (including foci of multifocality and intervening normal breast parenchyma) between 2.1 and 3.0 cm

CONCLUSION

- The acceptance of APBI as a standard of care therefore rides on its ability to match or better WBI in terms of efficacy, quality of life outcomes, and cost-effectiveness.
- Studies are required, not only to evaluate the efficacy of APBI, but also to assess the safety and toxicity of the various techniques and dosing schedules.
- Furthermore, it is hoped that more research will be carried out to determine the strengths and weaknesses of the different techniques; thereby creating a consensus and identifying where each technique may be best applied.

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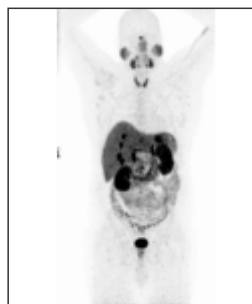
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Printed and Published by **DR. BHARAT GADHAVI** on behalf of **HCG MEDI-SURGE HOSPITALS PRIVATE LIMITED** and
Printed at Print Vision Private Limited., Print Vision House, Opp. Central Bank of India, Ambawadi, Ahmedabad – 380 006. Published at
HCG MEDI- SURGE HOSPITALS PRIVATE LIMITED. Mithakhali, Ellisbridge, AHMEDABAD – 380 006. **Editor - DR. BHARAT GADHAVI.**

Place of Publication : HCG MEDI-SURGE HOSPITALS PRIVATE LIMITED, Mithakhali, Ellisbridge, Ahmedabad-380006

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