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August 2020



Organization Accredited
by Joint Commission International



Life and
Cancer

Home Care-
Post treatment

Guest
experience

Case
Snippets

A large magnifying glass with a dark grey handle and frame, centered over the main title. The lens is focused on the text "PRO NEWS" and "TOGETHER TO WIN".

PRO NEWS

TOGETHER TO WIN

JCI
Accreditation

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More than 25 years ago, we noted the growing prevalence of cancer in India, the lack of Oncology centres in the country and this was the genesis of Apollo embarking on advanced cancer care. From the very beginning, we brought in the most advanced technologies in cancer care and even the recent launch of South Asia and the Middle East's first Proton Therapy at Apollo Proton Cancer Centre, reiterates our commitment to investing in the best available care for our patients. I am pleased that Apollo Proton Cancer Centre (APCC) has been accorded a special honour, it is now the first advanced cancer centre in India to be accredited by JCI. This recognition of our quality standards will further strengthen our resolve to keep raising the bar in Oncology!

- Dr Prathap C Reddy
Chairman, Apollo Hospitals



It was just about 12 months ago, that the very first Proton Therapy in South Asia and The Middle East was unveiled at the Apollo Proton Cancer Centre (APCC) in Chennai. It marked a definitive step ahead by making the world's most advanced radiation therapy much more accessible, benefitting a population of over 3.5 billion people. Now, once again raising the bar, APCC has become the first dedicated cancer hospital in India to be accredited by JCI, the gold standard for Quality. It is also the first successful Proton Therapy Centre accredited by JCI in South Asia and The Middle East. Further, this milestone was achieved despite the challenges posed by the pandemic, which underscores the APCC's commitment to quality and advanced patient care.

- Ms. Preetha Reddy
Vice Chairperson, Apollo Hospitals



Greetings from Apollo Proton Cancer Centre!

On behalf of APCC, I am delighted to inform that Apollo Proton Cancer Centre is accredited by Joint Commission International (JCI) for following the best healthcare standards in patient care and safety. It is a proud moment to achieve such recognition especially during such difficult times of COVID-19 pandemic. Within a year of operation, we have completed treating close to 200 patients with Proton Beam Therapy which is a remarkable achievement being the first proton centre in South Asia & Middle East. We have treated a mix of patients with Brain, Head & Neck, Breast, Thoracic, Prostate, Paediatric cancers and a wide range of cancer indications with Proton Therapy. Patients across the globe have been part of our journey. We offer them the best clinical outcome, the best services at the most affordable cost when compared to any centres world-wide. Our carefully crafted culture and perfectly blended team that consists of a rare combination of experience and expertise, will continue to help us in the pursuit of excellence in the healthcare sector. I thank everyone who has been a part of our success story. We at APCC are on a war footing to ensure our hospital is COVID green and completely safe for patients to undergo the cancer treatment as planned without any hindrance. The team is well-prepared to take necessary precautions to keep our patients safe and comfortable. With a thirst for constant learning and quest for knowledge, we are looking forward to registering yet another productive year in every aspect.

- Mr John Chandy

Chief Operating Officer, APCC

<https://www.youtube.com/watch?v=FLfDahw9HHc>

**FIRST DEDICATED CANCER HOSPITAL
IN INDIA ACCREDITED BY JCI**

Apollo Proton Cancer Centre
Chennai, India
has been
Accredited
by



Joint Commission International

which has evaluated this Hospital and found it to meet the international health care quality standards for patient care and organization management.

Effective 13 June 2020 through 12 June 2023

Tamra Minnier

Tamra Minnier, RN, MSN, FACHE
Chair

A handwritten signature in black ink, appearing to read "Paula Wilson".

Paula Wilson
President, Chief Executive Officer

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INDIA'S 1ST DEDICATED CANCER CENTRE



Apollo Proton Cancer Centre (APCC), the first Proton Therapy Centre in South Asia and The Middle East, today announced its accreditation by Joint Commission International (JCI), the recognized global leader in health care accreditation. This makes APCC, India's first dedicated cancer centre to receive this international accreditation, and the 8th hospital in the Apollo Hospitals Group to join the portfolio of JCI accredited hospitals. Since its commencement in June 2019, APCC has been the preferred cancer centre across the globe for Proton Therapy and Cancer Care Management. JCI accreditation is a prestigious achievement and benchmark in the healthcare industry for following the best global practices and offering exceptional patient care and safety.

The Apollo Proton Cancer Centre introduced Proton Therapy for the first time in India with the expertise of a Multi-Disciplinary Cancer Management Teams and an organ-specific practice. It is also the first and only Proton Centre in South Asia and the Middle East. To date, over 200 patients from across the globe have benefitted from Proton Therapy, within its first year of operation. The core clinical values of the Oncology team enabled with technology makes the treatment successful. A team of well-experienced doctors, management personnel, nurses and care professionals ensure that patients feel safe, comfortable and receive the epitome of oncology care during their journey of cancer treatment. The accreditation has motivated the team to push themselves to bring all the efforts together and forge better healthcare standards.



The APCC was conceived to be among the best in the world and in keeping with this vision; we have the latest state-of-the-art Proton Therapy machine with the best team of doctors handling various disciplines in Oncology to manage the centre. It is a matter of pride that the top 10 leading Cancer care specialists are working with us and to ensure they can deliver the best of care to our patients, we have equipped them with advanced ultramodern medical technology to ensure our centre is a world class proton care centre!



Joint Commission International (JCI) commends Apollo Proton Cancer Centre for its commitment to meeting international quality and patient safety standards by earning JCI accreditation during the global pandemic," says Paula Wilson, president and CEO, JCI. "This achievement was possible by utilizing JCI's virtual survey process, where surveys are conducted through the use of technology. This exemplifies how our virtual survey process supports physical distancing and other safety concerns while maintaining the same rigor as a JCI on-site survey."

The Joint Commission International accreditation is the gold standard given to organizations that practice and follow the highest International Standards in order to provide world-class patient care and safety. A team of expert JCI physicians, nurses, and health care administrators evaluated more than a thousand measurable elements and assessed the level of performance in relation to established standards and efforts for continuous improvements. This accreditation is proof of the meticulous standards of hospital management and cancer treatment established in the centre, enabling improved and advanced care for patients.

The Apollo Proton Cancer Centre aspires to be the best in cancer treatment with a multi-faceted team, providing a top-notch, safe experience for patients. APCC completed the audit and received the accreditation despite the difficult times of COVID-19 to bring the healthcare of international standards within the reach of every individual. This achievement by the team is a matter of great pride not only to Apollo Group, but also to the nation by being the first advanced cancer hospital in India to be accredited by JCI.



FROM THE DESK OF THE MEDICAL DIRECTOR

DEAR FRIENDS WELCOME TO THE INAUGURAL ISSUE OF THE APCC E-NEWSLETTER PRO-NEWS!

Apollo Proton Cancer Centre (APCC) has been envisaged with a particular vision built on the pillars of quality care embedded in an environment of vibrant academic culture. This is relatively a unique model especially in a private healthcare set-up. The centre is equipped with all the resources and infrastructure including modern state of the art modular surgical suites, navigation facilities, modern chemotherapy day-care facilities, aided by high-end diagnostics including South-Asia's first digital PET, 3-Tesla MRI, digital pathology amongst others. Since inception, the aim has been to deliver precision care with functionally sparing minimally invasive surgeries, high precision radiotherapy and chemotherapy. Within a year of its inception, APCC has already carved a niche nationally and internationally and committed to consolidate this good beginning forward.

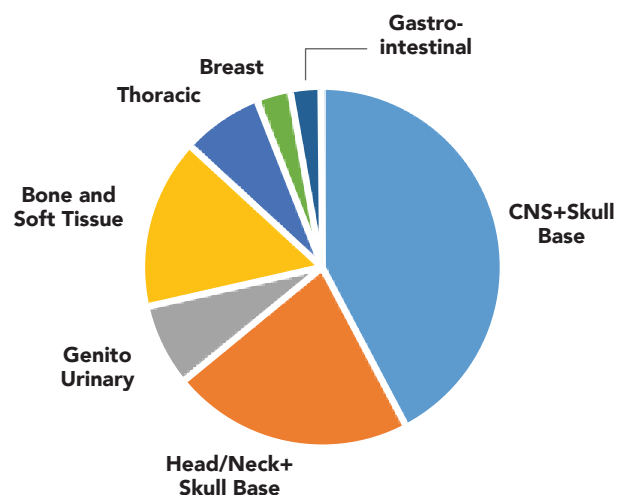
At the cornerstone of this ongoing journey have been our dedicated multi-disciplinary site-specific Cancer Management Team (CMT) members including physicians, nurses, care coordinators, managers and other support staff. Based on regular site-specific MDT meetings we have been delivering personalised care plans for each patient as per the best available clinical evidence. Right from the beginning there has been a strong thrust towards generating quality evidence in cancer care aided by our in-house clinical research office (CRO). Weekly clinical academic meetings, journal clubs are a testimony to the unique model of clinical excellence with strong academic and research based ethos of APCC. We have and are in the process of initiating several

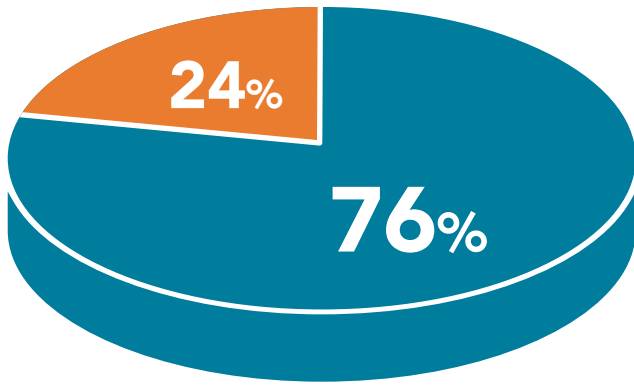
relevant clinical studies including site-specific registries and contributing to scientific literature in various forums and cancer journals etc.

Proton therapy being one of the significant aspects of APCC, is delivered by the most advanced Pencil Beam technology with image guidance aided by in-built cone beam CT, robotic couch, surface guidance as well as treatment planning using Monte-Carlo algorithms. Treatment is delivered by a well-knit and highly skilled team of clinicians, medical physicists and radiation therapy technologists working closely with each other. More than 200 patients with cancers in various sites including not only the traditional proton therapy indications of skull base tumours, paediatric malignancies and prostate cancers but also appropriately selected benign/low grade and high grade CNS tumours, head & neck cancers, GI/Liver cancers, thoracic malignancies, breast cancers, pelvic/urological and gynaecological tumours and a range of re-irradiation cases, not only from India but around many parts of the world.

200 PATIENTS TREATED WITH

MODERN PROTON THERAPY





■ **Adult** ■ **Paediatric**

The Joint Commission International (JCI) accreditation with a gold seal for immaculate patient care is a testimony to our founding principles and perennial efforts to provide the best possible cancer care replete with love and compassion. The entire APCC team's special and swift actions and spirit has been evident during the current COVID pandemic situation, whereby we have been continuing to be fully functional providing the best care for all our patients.

In this inaugural issue of PRO-NEWS, we have curated interesting case examples of some challenging and complex cancers treated by our colleagues, life-style nuances for our cancer warriors and our patient experiences which keeps us motivating always to march ahead.

Wishing you happy reading!

Rakesh Jalali

CASE SNIPPETS



**CRANIOSPINAL IRRADIATION WITH
INTENSITY MODULATED PROTON
THERAPY (IMPT)**

**AWAKE CRANIOTOMY AND MICROSURGICAL
EXCISION USING INTRAOPERATIVE
NEUROMONITORING AND NEURONAVIGATION
GUIDANCE IN A CASE OF MOTOR CORTEX
GLIOMA ON A YOUNG ROBOTIC SURGEON**



**HEAD AND NECK CANCER MANAGEMENT USING
IMAGE GUIDED PENCIL BEAM SCANNING
PROTON THERAPY**

**IMPROVING QUALITY OF LIFE IN AN
OCTOGENARIAN WOMAN WITH INVASIVE
THYROID CARCINOMA**



**IMPACT OF IMAGE GUIDED INTENSITY
MODULATED PROTON THERAPY (IG-IMPT) FOR
HIGH RISK PROSTATE CANCER**

CRANIOSPINAL IRRADIATION WITH INTENSITY MODULATED PROTON THERAPY (IMPT)

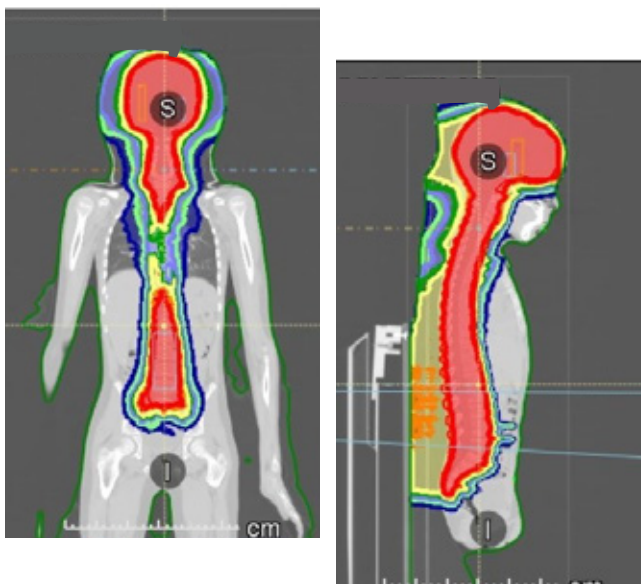


Brief History

A 9 years old cheerful boy, presented with a history of multiple episodes of projectile vomiting, moderate intensity headache and 1 episode of focal seizure in November 2019. On detail evaluation with MRI brain and spine screening revealed a 3.2 x 3.1 x 3.5 cm solid mass arising from inferior cerebellar vermis bulging onto 4th ventricle and foramen of magendie causing moderate obstructive hydrocephalus and transependymal seepage of CSF, with mass indenting dorsal aspect of medulla. No drop metastases were noted in spinal cord.

He underwent suboccipital craniotomy and gross total resection of lesion with extraventricular drain placement on 09.11.2019. Histopathology report suggested a diagnosis of Medulloblastoma, nodular and desmoplastic, sonic hedgehog subtype, WHO grade IV. During postoperative period he developed obstructive hydrocephalus for which he underwent Ventriculo-peritoneal shunt placement on 26.11.2019. Postoperative MRI was suggestive of no residual disease. CSF cytology revealed no evidence of atypical cells.

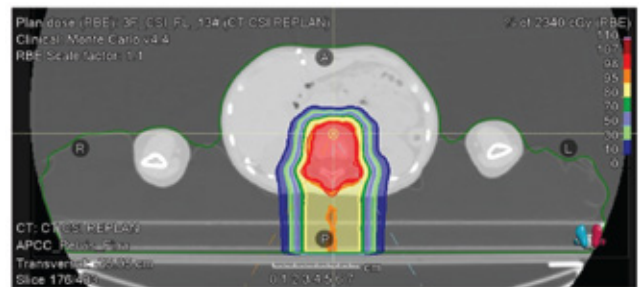
His case was discussed in our multidisciplinary tumour board meeting and it was decided to offer the patient Intensity modulated proton beam therapy with weekly vincristine followed by adjuvant chemotherapy.



Proton Therapy Planning

A three field CSI plan (two parallel opposed brain and one postero-anterior spine field) was made with pencil beam scanning technique using RBE scale factor = 1.1 to a dose of 23.4 CGE in 13 fractions followed by a posterior fossa boost of 30.6 CGE in 17 fractions to a total dose of 54 CGE in 30 fractions from 11.12.2019 to 24.01.2020.

As part of stringent quality assurance during the treatment, he underwent 4 QACT scans which were overlaid with radiation treatment plans to ensure satisfactory and optimal delivery of treatment. He had weight gain during treatment which was factored during the planning.



Treatment tolerance

He tolerated the treatment well and only had focal alopecia with Grade 1 skin reactions. He had Grade 2 neutropenia which did not require growth factor support. He did not have any interruptions during the treatment.

Proton therapy in CSI

Conventional CSI using photons with a linear accelerator delivers significant dose to surrounding normal tissues. Cranio-spinal irradiation with proton therapy has shown the potential to reduce normal tissue dose and associated post-treatment complications. Protons have the distinct advantage of minimal dose deposition beyond the Bragg peak. This allows dose to be limited to the anterior aspect of vertebral body with minimal dose extending to anterior structures. At Apollo proton Cancer centre (APCC), we have treated 12 patients with craniospinal irradiation using proton

beam therapy and 10 out of 12 had no significant gastrointestinal toxicity. At APCC, we have dedicated infrastructure for young patients who may require anaesthesia to stay on the treatment couch for the entire treatment session easing in the process of their immobilisation and reproducibility of initial CT simulation.

● Key references

1. A Phase 2 study done at Boston, USA in 2016 consisting of 59 patients aged 3-21 years, who had medulloblastoma has showed encouraging outcomes with proton radiotherapy with acceptable toxicity due to significant reduction of low dose region after a median follow up of 7 years.

<https://pubmed.ncbi.nlm.nih.gov/26830377/>

2. A very significant study was published last year in 2019 which has shown superior intellectual outcomes in patients treated with proton beam radiotherapy for cranio-spinal irradiation. They analysed longitudinal intelligence data from 79 patients which showed a favourable intellectual outcomes in the domains of global intelligence quotient (IQ), perceptual reasoning, and working memory compared with the conventional photon beam radiotherapy. It has provided with the strongest evidence to date of an intellectual sparing advantage with proton beam radiotherapy for CSI.

<https://ascopubs.org/doi/abs/10.1200/JCO.19.01706>

3. Our medical physics team at Apollo Proton Cancer Centre has also written a research paper, the manuscript of which is currently under review titled "Impact of spot positional error in robustly optimized intensity modulated proton therapy plan of CSI" – by Dr. Noufal MP, Dr. Dayananda Shamurailatpam Sharma, Mr. Kartikeshwar Patro, Mr. Manikandan A, Mr. Rajesh, Dr. Srinivas Chilukuri and Dr. Rakesh Jalali.

4. A prospective study published in 2018 of 116 patients with medulloblastoma treated with proton beam therapy showed an increased health related quality of life scores (HRQOL) after a median follow up of 5 years. Increased follow-up time from diagnosis correlated with improved HRQOL scores.

<https://pubmed.ncbi.nlm.nih.gov/29905942/>

⊙ Protons have the distinct advantage of minimal dose deposition beyond the Bragg peak.

⊙ At Apollo proton Cancer centre (APCC), we have treated 12 patients with craniospinal irradiation using proton beam therapy and 10 out of 12 had no significant gastrointestinal toxicity.

● Compiled by:

**Radiation Oncology Team &
Neuro Cancer Management Team**

AWAKE CRANIOTOMY AND MICROSURGICAL EXCISION USING INTRAOPERATIVE NEUROMONITORING AND NEURONAVIGATION GUIDANCE IN A CASE OF MOTOR CORTEX GLIOMA ON A YOUNG ROBOTIC SURGEON



● Brief History

A 31 years old gentleman, a budding surgeon training in the United Kingdom was in the pink of his health and did not suffer from any ailments until recently. He noticed clumsiness of the right leg after finishing his clinical duty which was overlooked as tiredness after over-exhaustion. Subsequently, one week later, he noticed tremulousness of the right leg. He suspected it to be seizures. Neurologist opinion was taken who suggested imaging. MRI showed a lesion in the left posterior frontal lobe, involving the motor cortex which controls the leg functions of the right side.

Shocked by the report, he decided to come to Chennai, Apollo Proton Cancer Centre where he was evaluated in detail by our neurosurgical team. A repeat MRI was done including special sequences like fMRI and tractography which showed the tumour abutting the right leg.

Perfusion studies were suggestive of a high-grade tumour. Left with no other option, he was counselled for the need of surgical decompression of the tumour with an attempt to remove the tumour as much as possible at the same time preserving his leg function; followed by adjuvant therapy if needed based on the biopsy report.

The same was discussed in our multidisciplinary tumour board which includes experts from neuroradiology, neuropathology, medical and radiation oncology. A consensus was made to perform an awake craniotomy with Intraoperative neuromonitoring and to do safe maximal tumour resection. The patient was convinced about the plan. The family also understood the magnitude of the problem and agreed for the same. He was taken to the operating room. Though he was anxious, he was made as comfortable as possible. Scalp blocks were given to reduce his pain perception and his head was fixed in a clamp to ensure immobility during surgery. Neuronavigation guidance was used to mark the site of the tumour using Advanced Medtronic Stealthstation S 8 system. Electrodes were placed painlessly in his right leg and right hand by an expert neurophysiologist. He was comfortable and cooperative and was discussing his career plans and the nature of his job in the UK. The craniotomy was performed over the marked area and the tumour and leg area was mapped. Fluorescein dye was used to find the abnormal regions of the brain using a state of the art neurosurgical microscope Carl Zeiss Kinevo.

The tumour resection was conducted while the patient was chatting with the neuro anaesthetist and the physiologist while he was also moving his legs and hands periodically. Towards the end of the surgery, he noticed some heaviness in the right knee; hence the tumour resection was suspended and cold saline irrigation was done onto the tumour cavity. After ten minutes, tumour resection was restarted but this time he felt an increase in clumsiness not only of the knee but also of the hip. Hence it was decided to stop the tumour resection to prevent a permanent neurological deficit for the right leg. The same was conveyed to the patient during surgery and he agreed for abandoning the procedure further though he was aware that there was around 20 % of the tumour left behind. Even though he felt little low that the tumour could not be removed completely, he felt happy that his leg function was unaffected by the surgery.

He recovered well and was discharged after three days of hospitalization with mild weakness in the right foot which had improved when he came for follow up after ten days.

His biopsy report turned out to be Diffuse astrocytoma, WHO grade II. The case was further discussed in the tumour board and it was decided to go ahead with proton therapy for the remaining tumour.

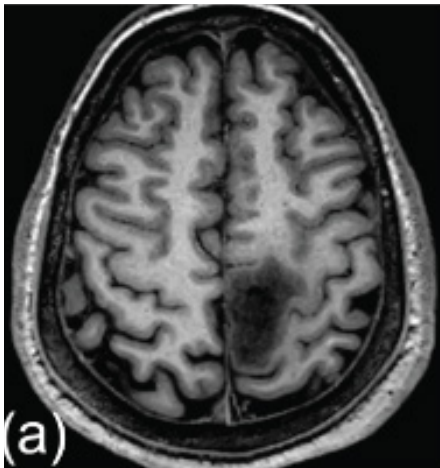
He completed six weeks of therapy and after staying in India for another month, he returned to the UK.

After a brief period of rest, he resumed his duties back. He is now performing surgeries actively. He is hale and healthy. He will undergo MRI imaging annually and will remain on regular follow up with us.

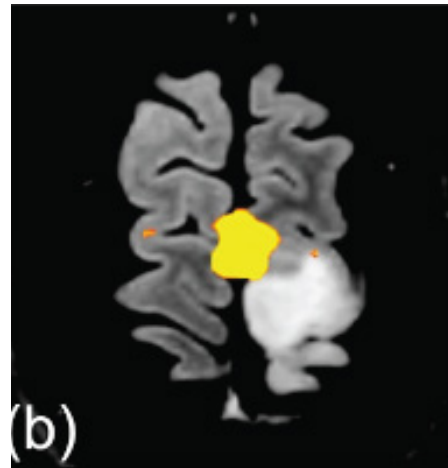
● Preoperative MRI

- a) MRI scan T1WI shows a hypointense lesion in the left motor cortex
- b) fMRI scan shows a bold signal close to the tumour area
- c) DTI shows tumour-infiltrating motor fibres posteriorly
- d) MR perfusion image showing high perfusion in the tumour area

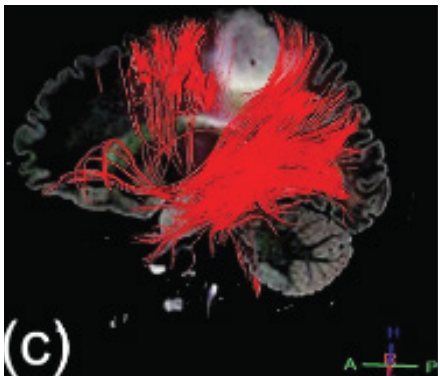
Preoperative MRI



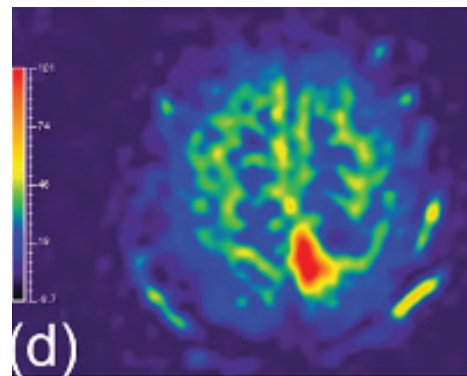
MRI scan T1WI shows a hypointense lesion in the left motor cortex



fMRI scan shows bold signal close to the tumor area

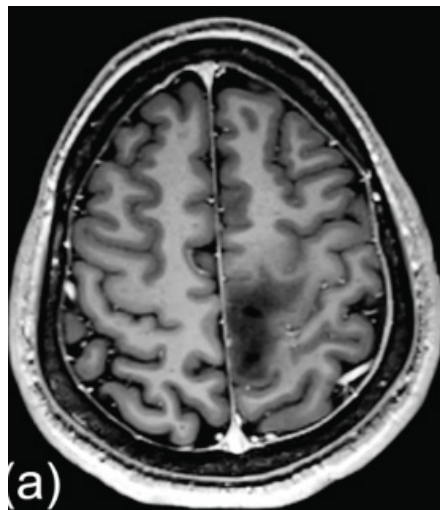


DTI shows tumor infiltrating motor fibres posteriorly



MR perfusion image showing high perfusion in tumor area

Post Operative MRI - Subtotal resection



Compiled by:

Neuro Surgical Oncological Team &
Neuro Cancer Management Team

HEAD AND NECK CANCER MANAGEMENT USING IMAGE GUIDED PENCIL BEAM SCANNING PROTON THERAPY

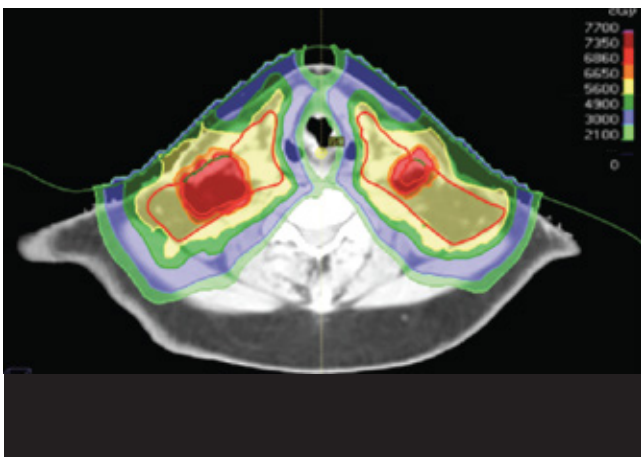


Intensity modulated proton therapy (IMPT) reduces radiation to normal tissues in head and neck, and is associated with less treatment related toxicity and improved quality of life compared to other radiation techniques. It also minimizes the chances of long-term feeding tube dependence by decreasing doses to dysphagia/aspiration related structures.

History:

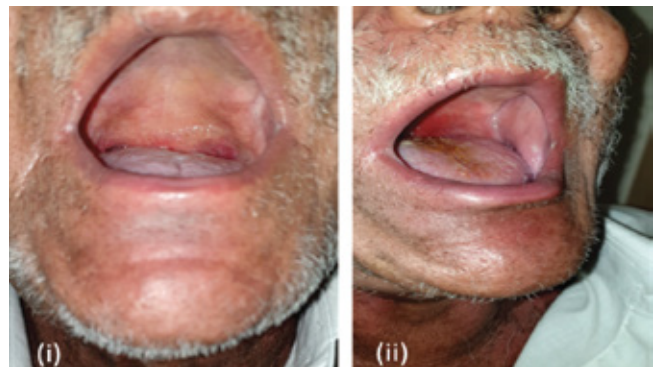
A 69-year gentleman with known hypertension was evaluated for complaints of swelling over the tongue for duration of three months. He was evaluated and found to have a growth involving the right half of the anterior tongue, extending posteriorly into the base of tongue with lymph nodes in the right neck. He underwent a biopsy from the tongue lesion, which was reported as squamous cell carcinoma, moderately differentiated. Staging work up did not reveal disease elsewhere in the body and the cancer was staged as cT3N2bM0. The patient was advised concurrent chemotherapy and radiation.

The patient family sought opinion at APCC regarding the role of proton therapy in treating this cancer. The patient was apprised regarding the role of proton therapy in reducing mucosal toxicity of chemoradiotherapy. Mucosal toxicity is associated with the risk of weight loss and requirement of tube feeding. Reduction of mucosal toxicity is naturally also associated with reduced requirement of painkillers and supportive care, and may, in senior citizens allow optimal dose of radiation and chemotherapy to be delivered without a break.



Similarly reduction in dose to the pharyngeal constrictors is associated with a decreased risk of microaspiration. The latter are a matter of concern as a late effect of concurrent chemoradiotherapy. The patient was offered radiation with proton therapy to minimize acute and late toxicities.

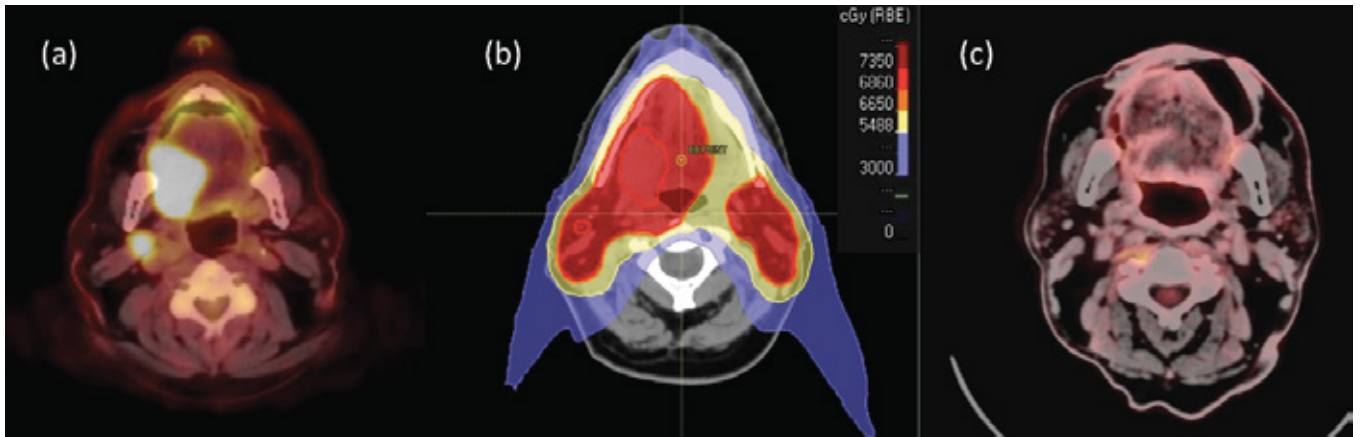
Following proper immobilization with thermoplastic mask, a planning CT scan was acquired and registered with planning MRI and PETCT. Gross disease and gross nodes were treated to a dose of 70 CGE and microscopic disease & elective lymph nodal stations to a dose of 56CGE in 35 fractions. Four field, oblique, multi field optimization (MFO) plan was generated with robustness. A robust plan was finalized where 95% of CTV70 and CTV56 received 99.4 and 99.9%, respectively, of the prescribed dose. The patient underwent kV CBCT based repositioning prior to each treatment session and also underwent quality assurance CTs scan (QACT) twice during the course of treatment. Inj Cisplatin was administered once weekly, concurrent with proton therapy.



The max dose (Dmax) of spinal cord was 8.37CGE, though maximum allowed is 45CGE and the usual achieved in other techniques is about 40 Gy. The mean dose of larynx was 25.2CGE (Fig 1), again a significant reduction over usual laryngeal doses when the bilateral neck nodal basins are being irradiated. The patient experienced grade 2 oral mucositis and grade 2 acute skin reactions (Fig 2) and did not require nasogastric tube. Treatment was completed, without interruption in 53 days, the patient lost only 2.7 kg of body weight.

During treatment, besides painstaking attention to detail and accuracy during planning and delivery of proton therapy, the patient also received holistic support to maintain nutrition, swallowing function and quality of life. He was followed up after 3 months & was noted to be disease free and symptom free. PETCT revealed a completed response (Fig3).

The treatment was conducted under the care of Dr Sapna Nangia, Sr Consultant Radiation Oncology and supported by the Head Neck Combined Management team comprising Dr T Raja, Sr Consultant Medical Oncology and Dr Naveen Hedne, Lead Consultant, Head Neck Surgery.



● Compiled by:

Radiation Oncology Team &
Head & Neck Cancer Management Team

IMPROVING QUALITY OF LIFE IN AN OCTOGENARIAN WOMAN WITH INVASIVE THYROID CARCINOMA



Introduction

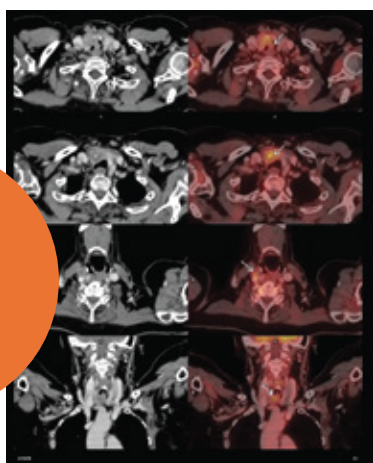
Thyroid cancers are the most common among endocrine cancers. The world-wide age-standardized incidence rate of thyroid cancers is 4 per 100,000.(1) Although thyroid cancers are known to have excellent prognosis, there are certain sub-groups of thyroid cancers with a poor prognosis.

Among the thyroid cancers, 6-13% shows extra-thyroid extension leading to greatest negative impact on prognosis. Extra-thyroid extension may lead to tracheal involvement in about one third of locally advanced thyroid cancers. Extensive tracheal involvement may lead to respiratory obstruction. Death due to respiratory obstruction is seen in about 50% of thyroid cancer patients.

In well selected patients, complete excision enables long survival and optimum palliation.(2) We present a case of Papillary carcinoma of thyroid with tracheal involvement in an octogenarian women which was managed successfully.

Case details

An 87 years old female from Myanmar presented to us with breathing difficulty since 8 months and blood stained sputum since 2 months. She was a known diabetic and hypertension on medications. On clinical examination there was mild enlargement of thyroid gland which was moving on deglutition. There was also a right level III node palpable in the neck



PET-CT

PET-CT showed a 2.7 X 2 cm hyper-metabolic nodule with a speck of calcification involving the lower pole of right lobe and the isthmus of thyroid with tracheal infiltration. Hyper-metabolic right level III cervical node was also seen. Ultrasound guided FNAC reported as Bethesda V (Suspicious of Papillary Carcinoma thyroid). Virtual bronchoscopy was done to map the intra-tracheal extension of the tumour. The findings of the virtual bronchoscopy showed the tumour infiltrating the anterior tracheal wall, partially occluding the lumen which was Shin's stage IV tracheal invasion. Preoperative video laryngoscopy was done and vocal cords were equal and mobile bilaterally. Based on the examination and investigations, the clinical stage of the tumour was derived as T4a N1b M0.

The case was discussed in multi-disciplinary tumor board and taken up for total thyroidectomy with tracheal resection and anastomosis and right selective neck dissection (II-IV). Horizontal skin crease incision was placed. Subplatysmal flaps were raised. Strap muscles were cut on the right side and preserved on the left side. Thyroid gland was identified. Superior laryngeal nerve and Recurrent laryngeal nerve were identified using nerve monitoring technique and preserved on both the sides. The superior and inferior thyroid pedicles were identified and cut bilaterally. Thyroid was found adherent to the anterior tracheal wall. Tracheal resection was done at low cricoid level. Intra tracheal tumor was visualized and cuts given with clear margins. Suprahyoid muscles were detached from the hyoid bone. Hyoid was dropped down. Montgomery's suprahyoid release was utilized to achieve adequate laryngeal drop, to facilitate a safe anastomosis. Tracheal segmental resection was completed and end-to-end tracheal anastomosis was done primarily. Selective neck dissection was done from level II-IV. Postoperatively, the patient was monitored for calcium levels and supplemented with calcium. No signs of hypocalcemia were noted. The patient recovered uneventfully. No change in voice quality and no dyspnea postoperatively.

Histopathology was reported as Papillary carcinoma thyroid with gross invasion of trachea. Macroscopic and microscopic extra-thyroidal extension was present. All surgical margins were free of tumor. Four nodes were positive. Pathological staging was pT4a N1b Mx (STAGE III). In view of her advancing age, we advised for close followup.

● Discussion

Over 90% of the thyroid carcinomas are differentiated thyroid carcinomas. 10-year survival rate of differentiated thyroid carcinomas range from 97-98%. Presence of extra-thyroid extension drastically reduces the 10-year survival rate to 45%. Extra-thyroid extension may lead to tracheal involvement in about one-third of locally advanced thyroid cancers. Extensive tracheal involvement may lead to respiratory obstruction.

Surgery remains the main modality of treatment for thyroid cancers with tracheal infiltration, with the goal of complete resection with negative margins. However, surgery in these patients is associated with high amount of morbidity and mortality.(2) Tracheal invasion is staged by Shin's staging system. Based on the Shin's staging, superficial invasion of trachea can be considered for Shave excision. Following shave procedure, radioiodine ablation may be required to tackle the residual microscopic disease. Window resection is usually indicated if less than 4 tracheal rings are involved. For tracheal involvement of 4–6 cartilage rings, circumferential sleeve resection may be considered. Gaissert et al. showed that early tracheal resection provided a better disease-free interval and overall survival when compared with shave procedures. (3)

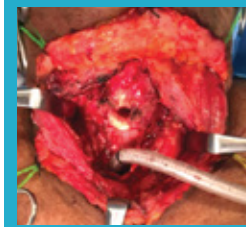
The most common and crucial complications of thyroid surgery are recurrent laryngeal nerve palsy and hypocalcemia. The best and most acceptable technique to avoid Recurrent laryngeal nerve injury is the identification of the nerve during surgery. This is done either by intraoperative neuromonitoring or by direct visualization technique. Intraoperative neuromonitoring helps the surgeon to identify and verify the functional integrity of the Recurrent laryngeal nerve.(4) We used intraoperative neuromonitoring to accurately identify and preserve superior and recurrent laryngeal nerves.

Anastomotic dehiscence is one of the most fearful complication of tracheal resection and anastomosis since it is a life-threatening condition. Incidence of anastomotic dehiscence following tracheal resection and anastomosis ranges from 4% to 14% with a mortality of 7.8%. Tracheal resections of more than 4 cm demonstrate a high anastomotic dehiscence rate. Thus, it is important to mobilize the larynx in order to perform an end-to-end tension-free anastomosis. There are two mobilization techniques used. These are Montgomery's suprahyoid release technique and laryngeal release technique of Dedo and Fishman.(5) To reduce the tension at the anastomotic site, it is useful to keep the neck flexed in a "chin to chest" position by two stitches placed in the submental crease and through the upper thoracic skin during the postoperative period. These stitches can be kept till the 6th or 7th postoperative day.

● Compiled by:

Head & Neck Surgical Oncology Team &
Head & Neck Cancer Management Team

Resected specimen showing tracheal wall with tumour



Post tracheal resection

Post tracheal anastomosis



● Conclusion

Surgical management of invasive thyroid carcinoma is essential, as airway obstruction is the leading cause of death in these cases. Even though there is a risk of surgical morbidity, complete surgical resection is important in order to reduce the chance of recurrence and improve survival. This case had a favorable outcome with optimum disease clearance and an improvement in the quality of life.

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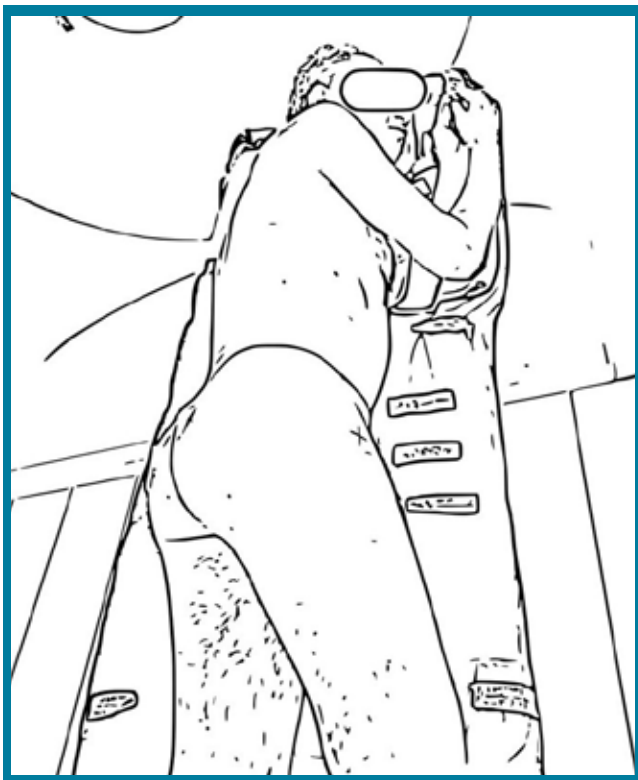
SACRAL CHORDOMA MANAGEMENT USING IMAGE GUIDED PENCIL BEAM SCANNING PROTON THERAPY



Unusual positioning of sacral chordoma while treating on proton therapy

A 64-year gentleman presented to us with chronic constipation and a low backache with inability to sit or lie down comfortably. He was diagnosed with a sacral chordoma 10 years ago for which he underwent surgery twice in 2009 and 2012. The recent MRI showed a large 90x60x35mm recurrence in the left sacro-coccygeal region with extension to left gluteus region involving sacrotuberous ligament. Another satellite nodule was noted along the paramedian part of left gluteal region infiltrating the medial part of left gluteus maximus. On examination he had induration of the skin over left gluteal region. Patient was evaluated for surgery and based on surgeon's inputs, patient did not wish for re-surgery and was planned for local intensity modulated proton therapy (IMPT).

After thorough bladder and bowel preparation, patient was taken up for immobilization. Since the patient was unable to lie down comfortably either prone or supine, immobilization was attempted in left lateral position with arms at chest level on a Vacuum bag [Fig1a]. The patient underwent CT



simulation and MRI pelvis in the same position. Gross tumor volume (GTV) was contoured based on several sequence on MRI and was expanded (1.5cm) to generate CTV to include microscopic extensions of the disease liberally. Skin was included in CTV at regions where GTV was close to skin and excluded from rectum, sigmoid and bowel. Gross disease was prescribed a dose of 70.4CGE in 32 fractions (EQD2-74Gy) and the microscopic intermediate risk CTV was prescribed a dose of 64CGE in 32 fractions.



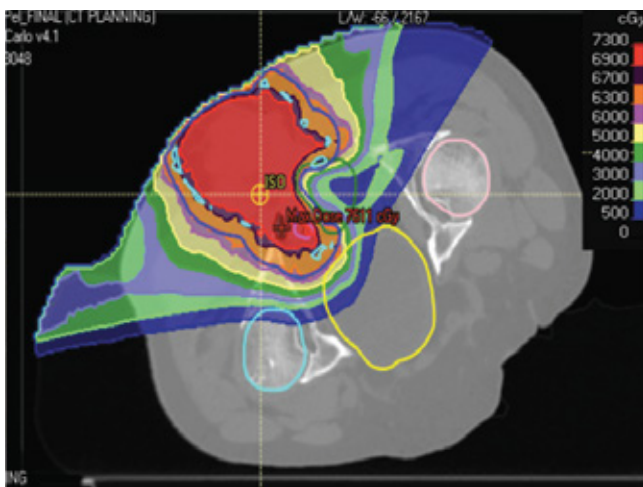
(a)

A 4-field multi field optimization (MFO) plan was generated with robust optimization. The robust optimization ensured the robustness of the dose coverage up to 3mm setup error and 3.5% range uncertainty. [Fig 2b]. The dose achieved for all the organs at risk was as per our initial treatment goals. (table-1) We used kilo Voltage cone beam CT (kV-CBCT) and KV X-rays for daily image guidance with a strict bladder and bowel protocol. Because of the unusual position of the patient, surface guidance was used to set up and for intra-fraction monitoring of the patient position. Patient was also evaluated with weekly quality assurance CT imaging to assess finer soft tissue changes in the patient, tumor or bowel. Patient tolerated the treatment well with only grade 3 skin toxicity. There were no significant bowel, rectal or genito-urinary toxicities. Patient improved significantly post treatment and was able to lie down and sit comfortably. 6 monthly imaging showed stable disease with a favourable response with low perfusion on T1 perfusion/DCE MRI (Fig 3).

Learning Points:

MFO IMPT plan was able to deliver 74CGE equivalent to the gross tumor with safe doses to adjacent radiosensitive structures such as sigmoid, small bowel, sacral plexus and rectum.

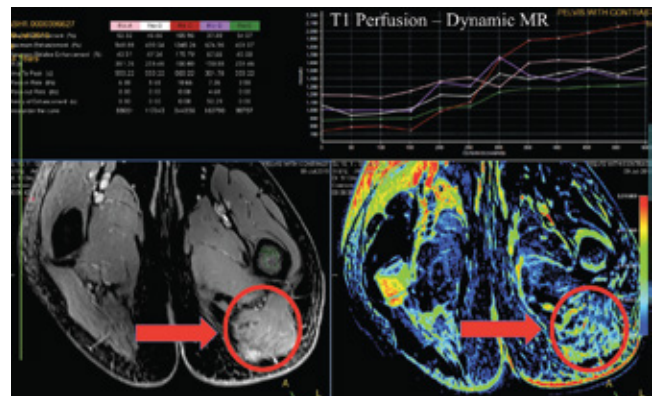
Despite the patient's unusual position, it was reproducible every day with help of on board imaging and surface guidance. (our set up variations along X, Y Z are 0.42cm, 0.66 cm, -0.26 and rotation, pitch, roll are -0.020, 0.540, -0.220 respectively)



Patients of sacral chordoma being treated on radiation/proton therapy need very strict bowel protocol with occasional insertion of flatus tube in to the rectum to deflate the rectal/bowel gas

Since chordomas are known to respond extremely slowly with a TC50 (time taken for chordoma to reduce its size by 50%) of nearly 26 months, DCE MRI or T1 perfusion curves could identify patients with early response.

Chordoma is known to extend along the muscular and subcutaneous plane. Generous CTV margins especially laterally and cranio-caudally is essential to ensure good coverage of the microscopic disease.



Organs at Risk	Clinical Goal	Value	Fulfilled
Sigmoid	at most 0.03cc vol at 7000 cGy dose	0.00 cc	Yes
	at most 2cc vol at 6500 cGy dose	0.07 cc	Yes
	at most 5 cc vol at 6300 cGy dose	0.44 cc	Yes
Rectum	at most 17% vol at 6500 cGy dose	5.58%	Yes
	at most 35% vol at 4000 cGy dose	52.56%	No
Bladder	Mean Dose (CGE) < 5Gy	3.73 Gy	Yes
Bowel Bag	At most 20 cc at 5000cGy dose	17.4 cc	Yes
	At most 120 cc at 1500cGy dose	64 cc	Yes
Right Femoral Head	Max (CGE)	12.4	Yes
Left Femoral Head	Max (CGE)	35.6	Yes

Compiled by:

Radiation Oncology Team

LIFE AND CANCER



Every cancer survivor is eager to get back on feet and live their peaceful life. Apart from your first phase of recovery, you've got many other ways by which you can improve your health, thus enjoying healthier future free from cancer.

Cancer survivor are given similar recommendations just as any other individual who wants to lead a healthy life.

Eat a healthy diet that is balanced, exercise frequently, maintain an ideal BMI, have a regular sleep pattern, avoid stress, avoid smoking, and control your alcohol intake.

However, for those who have survived the menace called cancer, the tips below have additional benefits. These tips can boost the quality of your life, smoothening your post-cancer years. Here are a few things you can do to live a better life after cancer.

● Exercise regularly

Exercising regularly boosts your self-esteem and general well-being and also facilitates recovery.

The following are some of the benefits of exercising:

- Better your endurance and strength
- Makes you feel happy and reduces stress
- Reduces anxiety
- Decreases fatigue
- High self-esteem and confidence
- Improves your quality of sleep
- Reduces risk of recurrence (of cancer)

Making physical activity and exercises a part of your routine doesn't require much work. Just take things gradually. Consult your doctor before you start any exercise activity.

● Eat a balanced diet

You must eat a balanced diet. You should consume lots of vegetables and fruits in your diet. Recommendations by the American Cancer Society for cancer survivors include:

- Consuming no less than 2.5 cups of vegetables and fruits daily.
- Eat healthy fats, for instance, omega-3-fatty acids. Walnuts and fish are the rich source of Omega-3 fatty acids.
- Your proteins should be sourced from foods that have low saturated fat, for example, eggs, lean meats, legumes, seeds, nuts, and fish.
- Choose healthy carbs, such as vegetables, fruits, legumes, and whole grains

Combining your foods this way will ensure that you are getting an adequate number of vitamins and other nutrients that'll strengthen your body.

You must resist the temptation to supplement your diet with mineral and vitamin supplements. Cancer survivors usually have this belief that if a small quantity of vitamins is good, then more must be better. Well, nothing could be farther from the truth. Large doses of supplements can cause more harm than good.

If you are concerned about your vitamin needs, verify from a doctor whether having a multivitamin daily is safe.



● Have a healthy weight

Weight loss is common among cancer patients. Yes! But weight gain is also common. Whether you've lost or gained weight in the course of treatment, you must maintain a healthy weight. Get it to the right level. Make an appointment with your doctor and discuss what's best for you & the right way to achieve the goal.

If your doctor recommends increasing your weight, then you'll have to make your meals appealing and easy to eat. A dietitian can help out. He or she will help you with great weight-gaining techniques.

You can work with your doctor to control pain, nausea, and other side effects of chemotherapy that may hinder getting proper nutrition.

If your goal is to lose weight, do it gradually. You should not lose more than two pounds weekly. Control your calorie intake and balance up with exercises. Losing a lot of weight might seem a daunting task. The key is taking it gradually.

● Adequate rest is important

Sleep disorders are common in cancer survivors. This may be a side effect of treatment, maybe physical changes, or any other reason.

But you must get adequate and restful sleep. It is worth noting that quality sleep enhances recovery. Sleeping allows your body and mind to rejuvenate so you can function at optimal conditions. Adequate sleep improves hormone function, boosts your cognitive skills, and reduces your blood pressure.

To increase your chances of sleeping well, you've got to practice good sleep hygiene. These include:

- Not taking caffeine in the evenings or late afternoon. As a rule of thumb, avoid caffeine eight hours before sleep time.
- Follow the same sleep schedule daily
- Put your gadgets away at least an hour or two before sleeping
- Keep your sleeping room dim and quiet

If you usually feel sleepy in the daytime, have a conversation with a doctor. It could be a sleep disorder due to cancer or cancer therapy.

Other helpful tips include:

- Minimizing your intake of alcohol
- Reduce stress
- Avoid tobacco and tobacco products

● Takeaway

It is not unusual for cancer survivors to worry that it will take a long time to achieve their health goals. But then, you should learn to take things easy. There's no rush.

Have a regular exercise routine and eat healthily. With these, you're on your way to perfect health.

HOME CARE - POST TREATMENT



● What is Total Laryngectomy?

A laryngectomy involves the removal of the voice box (larynx), separating the trachea (wind pipe) from the oesophagus (food pipe). This procedure involves the creation of a permanent tracheal stoma (hole in the neck), through which you will breathe.

● The changes that I may experience following my surgery

- Decreased ability to smell because you are unable to inhale odours through your nose.
- Decreased ability to taste because this is affected by odours and ability to smell.
- Inability to blow your nose because you cannot exhale air through your nose.
- Inability to hold your breath.
- You will not be able to swim
- Inability to warm, moisten, or filter the air you inhale. The body has natural filtering and humidification systems in the mouth and nose. These heat, add moisture and filter the air that we breathe. After a laryngectomy, the air that you breathe will no longer pass through these systems.

● Use of Heat Moisture Exchanger (HME)

The HME (Heat Moisture Exchanger) is a device which aids the humidification and filtering of the air you breathe. There are various HME systems available; most commonly we use the stoma cover 'bib' (ties around the neck) following removal of voice box.

It is important that you wear the HME system 24/7. The HME ensures that the air you breathe is warmed and filtered. This will in turn help to minimize the mucous you produce and minimize coughing and sputum plugs. It will also help keep the mucous thin and watery.

● What should I do for extra humidification?

Humidification will help you in keeping your secretions thin and watery and also prevents crusting.

- Increase the frequency of nebulisation
- Ensure you are well hydrated - drink plenty of water.
- Inhale steam through the stoma.



● Stoma care

Stoma is your airway. Take care of it.

- Your stoma must be cared for on a daily basis. Clean your stoma minimum twice daily.
- In the beginning, it will require more frequent care, because secretions often accumulate around the stoma and valve. Apply Vaseline around the edges of the stoma till the sutures are completely removed
- It is important that you become familiar with your stoma and know what it looks like. This way you can keep a watch on things like secretions, size, shape and colour of the stoma

Cleaning the stoma:

Make sure you have all the required items are ready before starting: A good light source, Mirror, Forceps (tweezers), warm water, Gauze, Small pocket torch.

- Good light source and mirror are very important and this will make life much easier.
- Small torch is helpful to check inside the entrance to your stoma for debris.
- Start with cleaning the skin on the outside of the stoma, working towards the inside.
- Use gauze and warm water to clean around the stoma and loosen any thick crusted secretions. Gently remove secretions using forceps.
- Take care that the debris does not fall into the airway
- If you have a voice prosthesis, be careful not to pull it out when doing this.
- If there is excess crusting, then first use nebulizer first to help loosen secretions and then use the tweezers. Be careful not to remove crusts without loosening them first



Showering and bathing after laryngectomy

- It is very important to make sure that water and soap do not enter the stoma when you are taking bath.
- Wear a special cover (laryngectomy shower collar) before bathing.
- If possible, use a hand shower rather than fixed shower head. Otherwise redirect the shower head so that the water falls below chest level.
- Stand with your back to the direction of the water spray.

How to prevent the decrease in size of the stoma?

- Over a period of time the stoma may slowly decrease in size. This is called stomal stenosis. The stoma size can be maintained by periodic or continuous use of a larytube.

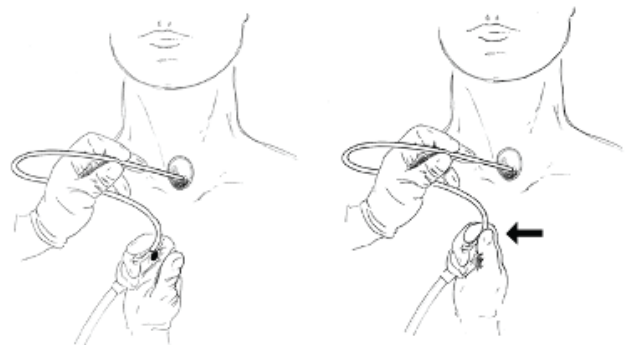


Suction

Suctioning should not be done routinely. Patients should be encouraged to cough and clear their secretions via the stoma; where necessary a yankaur suction catheter can be used to remove secretions on coughing from the stoma.

Deep suctioning using a suction catheter is only recommended to clear secretions if the patient is having difficulty because of an ineffective cough

- Connect suction catheter to tubing from suction machine.
- Moisten catheter tip with saline solution.
- Take deep breath.
- Gently insert the catheter through the stoma. Do not cover the suction control vent while you insert the catheter. Pass the catheter as far as you can without force, then withdraw slightly before starting suction. Close the suction vent while removing the tube. Try not to touch any walls of the wind pipe while suctioning.
- Suction saline solution to clean the catheter.
- Do not insert the catheter more than 3 times during a suctioning period. Take a few deep breaths between each time the suction catheter is inserted. If more suctioning is needed, allow yourself a 5- or 10-minute rest.



COVID-19 PREPAREDNESS AT APCC



We at APCC are on a war footing to ensure our hospital is COVID Green, Our Hospital has been accredited by Joint Commission International (JCI), a goal standard for following highest international healthcare quality standards in patient care & Safety. We have multiple layers of precautions that we have to keep our patients and our staffs safe from this virus.



- During the period when the COVID-19 results are awaited the treatment will not be stopped and the treatment will continue with all necessary precautions.
- Any Patient & attender arriving from any other state outside Tamil Nadu via Flight, Train or by Road are required to undergo COVID-19 test 48 HR prior to their travel.



● How we keep our Hospital safe during COVID-19 pandemic

- We have a dedicated COVID screening desk through which every person be it patient, attender staffs and also our heroes **"the doctors & nurses"** are screened for temperature, hand sanitized and provided masks.
- All patients and attenders are required to fill in a self-declaration form, that asks you questions such as Travel History, contact with any suspected or positive COVID patients, etc
- Every individual in the hospital premises is mandated to wear masks.
- Sanitizers are placed strategically throughout the hospital to ensure that frequent hand sanitization is maintained by everyone.
- Any patient before the start of the treatment is advised to undergo a COVID-19 test, this ensures that all our patients are safe.
- Any Patient & attender arriving from any other district in Tamil Nadu other than Chennai district are required to undergo COVID-19 test, if they are unable to do the test for any reason, we will arrange for the COVID-19 test samples to be collected from APCC.

● Logistics

Our team of specially trained professionals will ensure that you will have a seamless travel experience.

- Our team will provide you with supporting letters to the concerned authorities that will allow you for a hassle free passage through COVID check points at airport, Railway station and road.
- This letter has till date helped numerous patient reach the hospital without any hassle and receive timely treatment during this COVID pandemic.
- Our team will handhold you through this otherwise tedious journey and make it a stress free one.



● Accommodation in Chennai

It is always a nerve racking decision to make when you have to decide where you would stay when you visit our hospital. Will the place be hygienic? Is it safe for my family to stay? Will it be far from the hospital? Or is it safe from COVID? We have the answer to all your queries!



- Our hospital has Spacious and well equipped private guest rooms in four categories, Deluxe, Premier, Executive suite & Presidential Suite.
- Our highly experienced Chefs will cater to your taste and preferences
- We have a Multi cuisine Café that offers nutritious food and beverages.
- Our guest rooms are located on a separate floor from the Inpatient rooms.
- We follow International disinfecting standards that ensures our patients an infection free environment.
- We have reinforced our Infectious disease protocol to the current COVID-19 threat as per International & Domestic guidelines.



We also have tie up with reputed hotels within the vicinity of the hospital providing accommodation at subsidized tariff.

GUEST EXPERIENCE



Dr Smarajit Patnaik, Bhuvaneshwar

<https://www.facebook.com/watch/?v=187877842276461>



Mrs. Jebin, London

<https://www.youtube.com/watch?v=qEd0mtYQXbY>



I am Dr. Urvashi Shivdasani from Mumbai. I underwent Proton Therapy at APCC. I came to know about the hospital through a newspaper. I was treated by Dr. Sapna Nangia who is simply excellent with her service & care



Dr Urvashi Shivdasani, Mumbai

<https://www.facebook.com/ApolloProton/photos/a.1020733768119680/1510483719144680/?type=3&theater>




Mr. Mohammed Jamal Uddin, Bangladesh

https://www.youtube.com/watch?v=cw6hgnB__yM&t=17s



PROTON

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