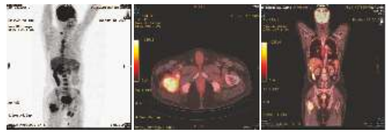
PATHOLOGICAL FRACTURE AS A PRESENTATION IN HEPATOCELLULAR CANCER

A 69-year-old gentleman presented us with right hip pain since 1 month. An X-ray of involved site was suggestive of Pathological fracture neck of femur and for which he underwent open reduction with internal fixation. The biopsy of the lesion was suggestive of undifferentiated carcinoma, patient underwent whole body PET-CT which showed Hypermetabolic right cervical and mediastinal nodes. Poorly defined lesion in the segment VI of the liver measuring 18x15 mm with hyper metabolism, intensive hypermetabolic right femur neck lesion with cortical break.

At this point of time, we considered all possible cancers which could metastasize to (prostate, lung, renal, thyroid etc.) bone. The biopsy of tumour markers, such as PSA, CEA, AFP, CA 19-9 etc. were not suggestive of any primary. We had to go ahead with IHC, which finally could identify the primary as Hepatocellular cancer. He had no risk factors for hepatocellular cancer (HBsAg, HCV negative, non-alcoholic).



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COMPREHENSIVE BLOOD & BONE MARROW TRANSPLANTATION SERVICES AT AMERICAN ONCOLOGY INSTITUTE

Blood and bone marrow disorders include a wide range of cancerous and non-cancerous ailments, affecting both adults as well as children. In India, about 10,000 children are born with Thalassemia major each year, and about 6,000 cases are diagnosed with Aplastic Anemia per year. The number of Leukemia and Lymphoma patients is more than 100,000. The number of patients requiring Bone Marrow Transplant is also increasing day by day. With the increasing awareness about Hematological diseases, many patients are opting for Bone Marrow Transplant as a definite treatment for many curable Hematological diseases.

In the Telugu states, approximately 4,000 Thalassemia patients are registered with various centers. For Hemophilia, 1,000 patients are registered with the Hyderabad chapter alone. Bone marrow is the soft, fatty tissue inside human bones. The bone marrow produces blood cells. Stem cells are immature cells in the bone marrow that give rise to all of different blood cells. A Bone Marrow Transplant is a procedure to replace damaged or destroyed bone marrow with healthy bone marrow stem cells.

There are two types of Bone Marrow Transplantation: Allogeneic BMT and Autologous BMT. In Allogeneic BMT, blood stem cells are obtained from the bone marrow of a donor post successful assessment of compatibility. In Autologous BMT, the bone marrow is taken from the patient itself and re-infused to the body. Before BMT is done on a patient, the marrow is first killed off with drugs or radiation.

The team at the launch of the Hemato Oncology Dept.

The Hemato Oncology and BMT program at AOI is led by a multi-disciplinary team of doctors comprising internationally trained Hemato Oncologists, Pediatric Hemato Oncologists and Bone Marrow Transplant Physicians. The Clinicians specialize in treating all types of cancerous and non-cancerous blood disorders for both children and adults. Their specialization also includes performing Autologous and Allogenic Bone Marrow Transplantations. The dept. is equipped with 18 sterile and isolated rooms to treat all types of blood disorders across all ages.

The state-of-the-art BMT unit at AOI is equipped with heap filters, Apheresis machine, AHU, automatic and selective control system, dedicated X-ray machine, ultrasound machine, dialysis machine and ventilator. Patients requiring requisite services need not travel to other X-ray Depts. or Dialysis Units and get exposed to infections. The unit also provides BMT (Pre & Post) counseling & support, and has a dedicated nursing team.

The unit also benefits greatly from integrated care services such as 24x7 ICU, 24x7 Blood Bank, comprehensive Diagnostics, NICU, PICU, Cardiac unit etc. from Citizens Specialty Hospital, the multi-specialty partner operating from the same campus. Some of the conditions treated at AOI include Myeloma, Lymphoma, Pediatric tumors, Multiple sclerosis, Thalassemia, Sickle Cell Disease, Aplastic Anemia, Acute Leukemia, Chronic Leukemia, and Auto-immune Diseases.

ACUTE PROMYELOCYTIC LEUKAEMIA: A CASE REPORT

A 34-year-old male came with complaints of malena, bruising, fever and intermittent headache. A routine laboratory assessment demonstrated a Haematocrit of 30%, WBC of 3.3 × 109/L (8% Lymphocytes, 1% Monocytes, 4% Segmented Polymorph Nuclear Cells, 86% Promyelocytes and 1% blasts) and a platelet count of 43x 109/L. He was deemed to have low risk APML. Further his blood investigated for coagulation panel showed elevated Prothrombin time of 15.5 seconds (normal 11 - 13.5), partial Thromboplastin time of 42 seconds (normal 25–34), Fibrinogen of 562 mg/dL (normal, 212–470) and D-dimer 6.54 µg/mL (normal, <0.40). Peripheral blood film showed several circulating blasts with coarse reddish-purple granules and Auer rods in the Cytoplasm, convoluted Nuclei, prominent Nucleoli and fine open Chromatin consistent with Promyelocytes. Bone marrow aspirate revealed a Hypercellular marrow dominated by sheets of Promyelocytic-appearing blasts.

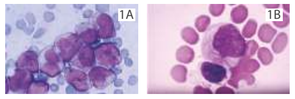

Figure 1: Leishman stained bone marrow aspirate smears showed Hypergranular Promyelocytes having Auer rods (1B) with in their cytoplasm.

Flowcytometry studies on bone marrow aspiration showed that the blasts were positive for CD117, CD13, CD33 and Myeloperoxidase, stained dimly for CD45, and did not express HLA-DR.

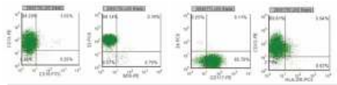

Figure 2: Flowcytometry showed blasts were positive for CD13, CD33, CD117 and negative for HLA-DR.

Cytogenetic analysis reports demonstrated the characteristic (15; 17) translocation and FISH analysis confirmed the presence of a PML/RARA rearrangement.

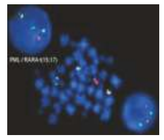

Figure 3: FISH showing translocation between PML (Chr 15) and RARA (Chr 17) *(PML - Promyelocytic Leukaemia, RARA - Retinoic Acid Receptor Alpha)*

We began induction therapy with ATRA (All Trans Retinoic Acid) (45 mg/m2daily in two divided doses PO) and Arsenic Trioxide (0.25mg/kg/day, IV). Over the course of the next 4 weeks, Haemorrhagic symptoms subsided. Consolidation therapy was given consisting of three cycles of ATRA + Arsenic Trioxide. He was in clinical and molecular complete remission at 18 months of follow up based on laboratory MRD (Minimal Residual Disease) by quantitative RT-PCR results.

We successfully treated our patient with only ATRA and Arsenic Trioxide therapy. This form of AML - M3 i.e., APML (low risk) can be treated without using any chemotherapeutic drugs and it has 85% cure rates.

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MULTIDISCIPLINARY TEAM WORK - THE CASE OF A 2-KG BABY WITH GASTRIC TERATOMA

One-month-old premature 34 weeks' male baby weighing 2.4 kg was presented to us 6 months ago with a history of a growing solid cystic mass in the left suprarenal region. The baby was born to a gestational diabetic mother after prolonged rupture of membranes at 34 weeks' gestation with a birth weight of 2.4 kg. He was in NICU in Vizag, for 6 days for feeding and antibiotics. Routine USS done at 6 days of life showed a solid cystic mass 3.3 x 2.3 cms. Repeat USS done one month later showed a complex solid cystic lesion in left suprarenal region now 6.5x6x5.5 cm. Parents consulted at AOI at this point of time. The baby was noted to be not gaining weight with difficulty in feeding on exclusive breast feeds. Clinical examination revealed a failing to thrive baby with a distended abdomen, prominent veins. A firm mass was felt in the left hypo-chondrium, extending into the left iliac fossa crossing the midline. CT scan revealed a 6.3 cm lesion with prominent minimally enhancing hypodense foci and scattered calcifications in the retroperitoneum on the left side crossing the midline with a differential diagnosis of Neuroblastoma/Teratoma. USS guided biopsy was suggestive of immature Teratoma. Serum Alfafetoprotien was 47,708 (within range for a day one baby but high for a one month old baby). Repeat AFP one week later, 1,75000 (tripled).

The parents were counseled in detail and baby was taken up for surgery. Pre-OP care, Surgery and post-OP care was carefully planned in close co-ordination with Pediatric Oncologist, Pediatric Anesthetist, Pediatric Surgeon, Oncosurgeon, Neonatologist, Blood Bank, SICU, NICU and Pediatric Haemato-Oncology nursing team. At surgery, a large cystic lesion arising from the posterior wall of the stomach pushing the left kidney down was noted. Posterior wall of the stomach was resected along with the tumor and repaired. Baby needed 2 packed red cell transfusions pre and post operatively. Baby was shifted to surgical ICU, stabilized, Epidural Catheter was placed for Analgesia and extubated on the evening of surgery. The baby was shifted to NICU the next day. He was kept NBM for 4 days in view of gastric repair and NG feeds gradually increased and baby shifted to ward on 7th post-operative day and discharged on the 9th day.

Final Diagnosis: Immature Gastric Teratoma, Grade 3 with high AFP and no yolk sac elements with no lesions elsewhere. The baby was discussed in the AOI international Tumor Board and the consensus opinion was to withhold Chemotherapy and follow up the baby closely with AFP. The baby gradually improved with good weight gain and falling AFP which normalized 3 months post-surgery. Currently, the baby is 5 months post-surgery, growing and developing normally.

Conclusion: This case highlights how we can achieve the best results for our patients with careful planning and well-coordinated multi-disciplinary team work.

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HAPLOIDENTICAL BBMT YIELDS EQUAL SUCCESS RATES AS FULL-MATCH TRANSPLANT

Blood & Bone Marrow Transplant (BBMT) is a medical procedure (no operation/surgery) where we infuse the healthy hematopoietic stem cells into blood of a patient affected with various cancerous & non-cancerous disorders (such as Aplastic Anemia, Thalassemia, SCID, Sickle Cell disease, various blood cancers) in which patient's own self HSC, are defective.

Other than medical fitness of patient, one of the basic requirement before BBMT is finding suitable 10/10 HLA matched donor. HLA is an antigen just like blood group present on almost all body cells. There is a restricted availability (only 25 - 33%) of 10/10 full matched HLA-donor for a particular patient. In such cases, we can do half matched (5/10), often called "Haploidentical-BBMT."

Almost every patient in his/her family have Haplo-matched donor, which can save cost of procuring hematopoietic stem cells. In comparison to full matched BBMT, Haploidentical transplant gives nearly equal success rate especially in cancerous hematological disorders.

First successful BBMT was done about 40 - 50 years back. Now with availability of excellent supportive care as well as better understanding of Pathophysiology about BBMT, success rates have touched up to 90 - 95% if done in early phase of underlying disease

Unlike solid organs transplant such as kidney, liver, heart etc., where patients have to take lifelong immuno-suppresive medicines, in BBMT patients are off medicines after one year and can live a normal, active life.

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ROLE OF SBRT IN CARCINOMA OF LUNG

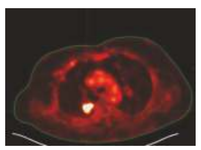
Stereotactic Body Radiation Therapy (SBRT) is a technique that allows delivery of very high doses of radiation, usually in several large fractions (Hypofractionated), by multiple co-planar and non co-planar beams and guided by a set of coordinates (Stereotactic). These co-ordinates are set in relationship to the precise location of the tumor, rather than a set of external marks (tattoos) or anatomical landmarks (such as bony structures). The principles of SBRT are an adaptation of the principles and experience gained from stereotactic brain radiation therapy. SBRT requires a precise definition of the target, assessment and/or management of target motion (*i.e.*, the respiratory excursion of the target), identification of a relatively tight Planning Target Volume (PTV), conformal RT planning, and daily high quality set-up verification prior to each treatment. For chest malignancies, tumor movement due to respiration is managed through a variety of approaches, including tumor tracking, gating delivery of treatment, and/or employing breath control techniques. SBRT administration achieves avoidance of normal tissue exposure to radiation during the planning process, by providing for sharp fall-off dose gradients outside the target.

SBRT has demonstrated high rates of primary tumor control for early lung cancer, medically inoperable and when patient is not willing for surgery. Although higher grade toxicity has been described, particularly when treating lesions near the pulmonary hilum, the overall rates of toxicity are low. As an outpatient non-invasive therapy, SBRT allows rapid recovery, minimal discomfort, and cost-effectiveness.

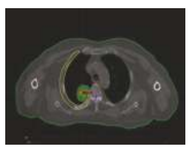
Case Report:
Patient is a 74-year-old gentleman who was evaluated for right sided chest pain and diagnosed to have Carcinoma of the right lung upper lobe. Biopsy from the lung lesion showed features of non-small cell Carcinoma. Staging whole-body PET CT showed evidence of irregular soft tissue lesion with central calcification measuring 2x2.4x2.5 cm in the posterior segment of right upper lobe, abutting the oblique fissure, no evidence of mediastinal nodal and distant metastasis. He is a known case of Type 2 diabetes and systemic hypertension on regular treatment. In view of elderly age and coexisting medical comorbidity, we planned for SBRT.

Patient was immobilized in a Vacloc in supine position. Planning 4D CT simulation was performed on a dedicated GE CT-Simulator. CT images were acquired in 2.5 mm slice thickness. Images were imported in DICOM format to the treatment planning workstation. 3D reconstruction of the images was performed and PET CT was fused. Contouring of Organs at Risk (OAR) and Target Volumes were done (based on standard international guidelines) on Soma Vision workstation. GTV, ITV and PTV was created. 50 Gy in 5 fractions was prescribed to PTV. Treatment planning was done using Eclipse Treatment Planning System. Patient set-up verification on the treatment couch was performed on daily basis using cone beam CT. 3 months post-treatment: Patient is asymptomatic and PET-CT scan showed negligible to non-FDG avid (SUV max: 1.0 vs 13.5 in previous scan) small irregular nodular lesion (1.3x1.0 cm vs 2.4x2.5 cm in previous scan) in posterior segment of RUL abutting the right major fissure. No other hyper metabolism was noted elsewhere in the body.

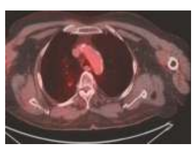
SBRT given appears to be associated with a high rate of tumor control, moderate treatment related morbidity, and infrequent need for surgical salvage in operable early stage lung cancer patients.



Pre-treatment PET-CT



SBRT Plan



Post-treatment PET-CT

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