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Royal Care

CHAIRMAN'S COLUMN

Greetings! from Royalcare

Healthcare is not only limited to doctor-patient relationship ,the whole industry is moving towards creating an enhanced experience for the patients. At Royalcare we are striving hard to take the healthcare to a new level by incorporating best minds, investing in cutting edge technologies and comprehensive care at all levels.

Within this quarter we will be launching SPECT gamma camera,bone marrow transplant (BMT) unit ,Neutropenic ICU and brachytherapy to the already existing PET-CT ,state of the art radiotherapy sytem –Varian Truebeam STX to make it to a true world class comprehensive Oncology care.

Regards

Dr. K. Madeswaran

Founder Chairman

From The Editor's Pen...

"It's easy to make promises; hard work to keep them".
- Boris Johnson

A Proud moment for not just our hospital, but the entire city where, Materio vigilance program of India has chosen Royal care hospital as one of its nodal centres amongst 15 other centres all over the country. It is noteworthy that Royal care is already centre for Pharmaco vigilance In India. Chairman Dr.K.Madeswaran made a promise in the very early phase of this hospital that he shall pursue excellence in all fields and is delivering it systematically.

Only the continued pursuit of excellence by the hospital, guided by the chairman makes achievements like this possible. NABH pre assessment was also completed by the national team on July 4th and 5th with minimal suggestions by them which shall be completed the management quickly before the final assessment.

The state of the art Varian True beam STX machine has been successfully functioning for the last 2 months and it is the first of its kind in western Tamil nadu. Institute of oncology is nearing completion where the facilities, once completed shall rival the best hospitals in the world with Laminar flow BMT, Dedicated neutropenic ICU etc.

We congratulate our consultants who presented in international conferences and also national conferences as invited faculty. Various camps and health awareness campaigns were conducted by the hospital and the general public benefited immensely. We have articles on Urology and Minimally invasive spine surgery with our spine surgeon using one of its kind "O" arm for precision surgery.

We also welcome the new consultants who have joined the Royal care family and wish them success in their future endeavours.

Inauguration and 1st STATE CONFERENCE

Tamilnadu has been on the forefront of cancer related healthcare for more than four decades and the need for a dedicated forum for conducting academic discussion, updating current knowledge and evolving strategies to fight cancers has been a long felt need amongst medical oncologists.

Taking into confidence, the vast experience of seniors and stalwarts , the dedication of existing contemporaries in the field and the growing enthusiasm of young paediatricians and oncologists, the seed of Tamilnadu Medical and Paediatric Oncologists Society was conceived. This society will go a long way to address and support various problems clinicians face in day to day practise.

On May 12th, 2019 we had the inauguration and the very 1st conference of TAMPOS as evidence of collaboration among Medical Oncologists, Haemato-Oncologists and Paediatric Oncologists under the able guidance of Padma Vibushan Dr. V. Shantha and Prof. Dr. S.Subramaniam, the luminaries in this field.

Dr. K. Kalaichelvi, HOD, Department of Medical Oncology, Madras Medical College, the President of the society, welcomed the gathering.

Dr. N. Sudhakar, Director, Royal Care Super Speciality Hospital, who is the Organising Secretary, spoke briefly on the steps from conception to realisation of this successful 1st State Conference.

Dr. K. Madeswaran, Chairman, Royal Care Super Speciality Hospital, graced the occasion.

Chief Guest, Padma Vibushan **Dr. V. Shanta**
Indian Oncologist & Chairperson of Adyar Cancer Institute, Chennai.

1st in WESTERN TAMIL NADU

TECHNOLOGY IS SCIENCE ACQUIRING IT IS ELEMENTAL USING FOR THE UPLIFTMENT OF MANKIND IS REVOLUTION

Proudly announcing 100 days of successful usage of latest precision technology in radiation treatment **"VarianTruebeam STX"** in patient care for the first time in Coimbatore.

STATE-OF-THE-ART VARIAN TRUEBEAM STX

PET CT ❖ SPECT ❖ BONE MARROW TRANSPLANT UNIT ❖ NEUTROPENIC ICU ❖ HIPEC

மேற்கு தமிழகத்தில் முதல்முறையாக VARIAN TRUEBEAM STX எனும் அதிநவீன கதிரியக்க கருவியின் மூலம் புற்றுநோய்க்கு கடந்த 100 நாட்களாக வெற்றிகரமாக சிகிச்சை அளித்து வருகிறோம்.

STATE-OF-THE-ART VARIAN TRUEBEAM STX

A Linear Accelerator or LINAC is a device which artificially produces ionising radiation, which maybe photons (high energy x-rays) or electrons. These photons and electrons are used to target cancer in various parts of the body.

TrueBeam STx is an advanced linear accelerator and radiosurgery treatment system that allows doctors to target hard-to-reach tumors. The TrueBeam can treat any solid cancer, but its special qualities may be of particular advantage with certain types of cancers like lung cancer, brain cancer, spinal cord tumors, liver cancer, pancreatic cancer, prostate cancer and many recurrent and inoperable tumors.

The TrueBeam STx can deliver various techniques of radiation therapy like 3D Conformal Radiation Therapy (3DCRT), very precise radiation therapy techniques like Intensity Modulated Radiation Therapy (IMRT) and Volumetric Arc Therapy (VMAT), Image Guided Radiation Therapy (IGRT) and also very high intensity, highly focussed radiation techniques like Stereotactic Radio-Surgery (SRS) and Stereotactic Radiation Therapy (SRT). With on-board imaging facilities like cone-beam CT (CBCT) and Kv Imaging (KVI), it is now possible to track the tumor movements even during respiration and accurately target the tumor, while saving the normal tissues. The Linear Accelerator is also equipped with multiple Electron energies to treat superficial tumors.

Imaging technology that sees the tumor and adjusts patient position

The TrueBeam machine uses cutting-edge imaging technology to capture images of your tumor, even when it moves during your natural breathing patterns. TrueBeam's on-board imaging system captures CT scans and fluoroscopy, or movie-like x-ray images to help physicians ensure that the patient's tumor and normal organs are positioned with millimeter accuracy, and that motion is properly controlled. It uses these images to confirm that the radiation beams are always targeting your tumor and not missing it. Imaging is also used to verify the exactness of patient and tumor positioning without any day-to-day variation or variation in bowel gas and bladder filling. These are the main features of IGRT or Image Guided Radiation Therapy.

Volumetric modulated arc therapy (RapidArc) for intricate sculpting of the radiation dose

Because tumors aren't perfectly round, TrueBeam STx can alter the shape of the radiation beam to match the shape of your tumor. This decreases the amount of radiation to healthy tissue that surrounds the tumor, thereby reducing the severity of side effects. It is also possible to deliver a differential dose of radiation within the same tumor volume.

Respiratory gating that virtually freezes tumor motion caused by breathing

The Respiratory Gating feature of TrueBeam STx is especially good for tumors in the chest and belly because it adjusts for movements in tumors, which are nudged in various directions with each breath. With respiratory gating, the TrueBeam sends out radiation only when the tumor is within the beam's line of delivery. In combination with the TrueBeam's on-board imaging, the effect is a much higher degree of protection for healthy tissue adjacent to the cancer resulting in lesser side effects.

Flattening filter free (FFF) mode for ultra-fast treatment.

SABR, also known as stereotactic radiosurgery (SRS) or stereotactic body radiation therapy (SBRT), is a type of cancer therapy in which very precisely focused beams of radiation target the tumor. The beams are as exact as a scalpel, but accomplish tumor destruction without any incisions. High Intensity Mode of TrueBeam STx rapidly delivers hypofractionated SRS and SBRT treatments resulting in reduced treatment times and better patient comfort. IMRT treatments which used to take 20 minutes can now be delivered in less than 5 minutes. SRS which used to consume a couple of hours can be completed in much shorter time.

The TrueBeam's capabilities mean physicians can have more confidence in the accuracy of treatment

- More accurate radiation targeting and tracking of tumors, especially in hard-to-reach areas.
- Improved effectiveness of radiation treatment.
- Shorter treatment times.
- Fewer complications and side effects.
- More treatment options for people who aren't eligible for traditional surgery.

Institute of Oncology Team

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Our Oncology Team

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MANAGEMENT AND ENSURING SAFETY OF MEDICAL DEVICES
Bio Medical - Training Programme

The Materio vigilance Programme of India (MvPI) to monitor the safety of medical devices in the country was formally launched on July 6, 2015 at Indian Pharmacopoeia Commission (IPC), Ministry of health and family welfare, Govt of India, to Improve the protection of the health & safety of patients, healthcare professionals and others by reducing the likelihood of recurrence of an adverse event associated with the use of Medical Devices.

Royal Care Super Speciality Hospital is one of the registered Medical Device Management Centers in India among the very few in the country with one of the important mandates being to provide safe and effective medical treatment.

The studies revealed that Medical Device Adverse Events in India are leading to prolongation of hospitalization which constitutes a significant economic burden on patients as well as the country.

To avoid sub-standard and incompatible devices flooded in Indian market, it is of utmost priority to have a vigilance system in place to record feedback from patients and users.

Generation of Medical Device safety data based on Indian Population will help educational initiatives to healthcare professionals for improving safe use of medical devices. If this can be achieved, public confidence can be restored and enhanced, and use of technology adopted for advanced treatment of healthcare conditions.

Dr. K. Madeswaran, Chairman, Royal Care Super Speciality Hospital, stated that this unique programme is first of its kind in the region to sensitize healthcare professional, manufacturers, importers and distributers of medical devices for better understanding of risk management and safety of medical devices. He also stressed the importance of technology required in healthcare and the need of these kind of continuous training programmes to provide safe and precise treatment.

Mrs. Shanthy Gunasekaran
Deputy Director, Central Drugs Standard Control Organisation
South Zone

NAVIGATION GUIDED DEFORMITY CORRECTION SURGERY IN A 9 YEAR OLD GIRL WITH JUVENILE NEUROMUSCULAR SCOLIOSIS:

Dr. M. Sudhakaran
MS (Ortho), DNB (Ortho), MNAMS, MRCS (Edin), FNB (Spine Surgery)
Fellow Endoscopy Spine Surgery (Endorsed by IITTSS)
Consultant Orthopaedic Spine Surgeon and Spine Endoscopist

Introduction :

Early-onset scoliosis (EOS) is a broader category including scoliosis in children <10 years old.Juvenile scoliosis is classically defined as scoliosis that is first diagnosed between the ages of 4 and 10. This category comprises about 10% to 15% of all idiopathic scoliosis in children, common in girls with the predominance of right main thoracic curve.

Generally scoliosis presenting before the age of 10 has a more complex and challenging presentation than that of scoliosis in an adolescent. [1][2]The patient's spine and thorax are still growing, yet a focus on lung development remains critical.

As a rule of thumb, approximately 20% of children who are younger than 10 and who have a curve greater than 20 degree will have high incidence of neural axis abnormalities (18-25%) like

1. Syringomyelia (cyst or tubular cavity within spinal cord) can be seen in a scoliotic curve without rotation can manifest as an asymmetric umbilicus reflex
2. Arnold-Chiari syndrome (cerebellar tonsil are elongated and protruding through the opening of the base of the skull and blocking CSF flow)
3. Tethered cord
4. Spinal dysraphism& spinal cord tumors

Juvenile scoliosis has high risk of progression. The risk of progression is related to the type of curve and the level of maturity of the child. The immature, premenstural girl has a higher risk of progression than an adolescent female who had the onset of menses, or an adolescent boy who has developed axillary hair. Nearly 95% of children in the juvenile age range go on to require surgical treatment.

Our case :

Active 9 year old girl miss. Rwiada, fifth child born to a healthy parents from yemen had skewed spine causing ugly look , occasional pain along ribs and back on standing prolonged. Her perinatal period was uneventful. Her parents noticed hump in the back 4 years ago, which is increasing in size causing disfigurement and occasional imbalance, when she is running. She has breathlessness and tiredness on prolonged walking/ running. No h/o sudden weakness, sensory abnormalities, trauma. She is premenarche.

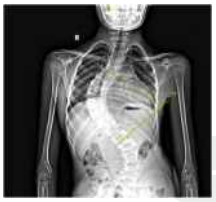
ON EXAMINATION, her general condition is good except for pallor and her respiratory reserve was good (6 minutes walk test - 408 mts with no desaturation) and no cardiac dysfunction (no congenital cardiac diseases). she is short statured for her age (115 cm height) and malnourished (18 kg). No neurocuaneous markers present.

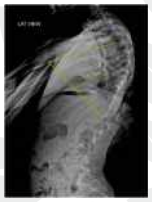
Local Examination :

She had right sided thoracic scoliosis (major curve) with left sided lumbar nonstructural curve (minor curve). She has prominent uneven shoulder blades with asymmetric flank. She had right sided shoulder up, right sided rib prominence and left sided pelvic obliquity with trunk decompensation. Curve is partially flexible on side bending (left bending).

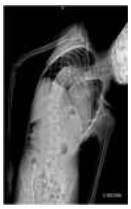
Clinical Picture

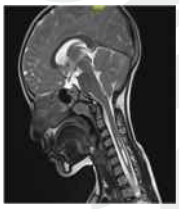
Investigations





AP View-Cobb Angle & Lateral View





MRI showing Arnold chiarl type 1 with syrinx

Treatment:

After obtaining cardiac clearance, pediatric opinion, pulmonologist review for lung reserve optimisation, physiatrist advice for physical fitness (perioperative), pt was operated in staged manner.

Stage 1: Foramen Magnum Decompression With Duroplasty by neurosurgery team headed by our chairman Dr.K.Madeshwaran. Postoperative period was uneventful.

Stage 2 : Navigation Guided Scoliotic Correction D4-l2 (selective Curve Fusion) With Neuro-monitoring Support.

After anaesthetic review, patient was explained about pro and cons of surgery in their own (arabic) language. Patient positioned prone after intubation and electordes connected for neuromonitoring device. Painted and drapped.O ARM initial 2D image taken to confirm the position followed by 3D (CT SCAN) spin and intercepted to STEALTH STATION 7 Navigation machine via reference frame placed at lower lumbar spinous process.midline exposure done from D4 to L2 .

Patient Positioning & Neuro Monitoring device connected

O-arm

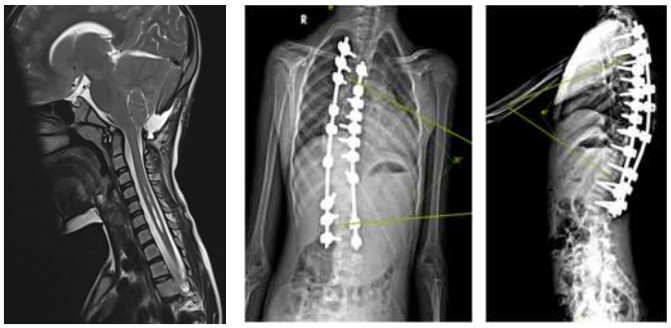
Navigation

Small and dysplastic pedicles are easily negotiated with realtime navigation by small diameter screws.basic four pillar construct at proximal and distal end made , maximum screws on concave side and staggering convex side made. Concave side rod fixed with rod derotation and cantilevering to reduce coronal deformity and dorsal kyphosis correction (less contoure rod). second convex rod applied with translation on right side. In afraid of screw pullout, D3 pedicle was added to the construct on convex side. Wound closed in layer over drain.

Postoperative period was uneventful. Patient electively placed in ICU for a day for analgesia care (on opioid epidural infusion). patient mobilised from day 2.allowed to walk/run from day 5.pt was discharged after 7 days.

Post op xrays (reduction in curve size shown by cobb angle)

Post-OP X-ray & MRI (Note the reduction of Cobb angle)



Pre & Post OP Clinical pictures (front & side view)

Discussion :

Scoliosis is defined as a deviation of the normal vertical line of the spine, consisting of a lateral curvature with rotation of the vertebrae within the curve. Typically, for scoliosis to be considered, there should be at least 10° of spinal angulation on the posterior-anterior radiograph associated with vertebral rotation . The causes of scoliosis vary and are classified broadly as congenital, neuromuscular, syndrome-related, idiopathic and spinal curvature due to secondary reasons. Congenital scoliosis is due to a vertebral abnormality causing the mechanical deviation of the normal spinal alignment. Scoliosis can be due to neurological conditions (eg, cerebral palsy or paralysis), muscular abnormalities (eg, Duchenne muscular dystrophy) or other syndromes (eg, Marfan syndrome and neurofibromatosis). Occasionally, significant lateral deviation of the spine can occur with little or no rotation of the spine and without bony abnormalities. In these cases, the 'scoliosis' can be the result of pain, spinal cord abnormalities, tumours (both

intraspinal and extraspinal) and infection. The majority of scoliosis cases encountered by the general practitioner will be without an obvious cause (idiopathic).

Patient History And Physical Examination

Usually, patients present spinal deformity or, more likely, chest wall and back asymmetry. Whether identified by the patient, their parents, or through school or physician screening programs, posterior chest wall prominence is the most outward manifestation of spinal curvature. With more significant scoliosis, adolescent girls sometimes notice a difference in their breast sizes. Other body characteristics may include shoulder asymmetry and overall posture imbalance in the coronal plane.While not typically the presenting symptom, back pain is not unusual.

The most reliable method of monitoring growth is simple height measurements. Furthermore, it is important to look at other markers of growth and maturity, including signs of puberty, onset of menarche and breast development. A complete neurological history should include inquiries of weakness, sensory changes, problems of balance, gait and coordination, as well as bowel and bladder difficulties such as incontinence. Significant disturbances in these may suggest intraspinal pathology such as syringomyelia (central spinal cord dilation), tethered cord or tumour (4,5).

A complete neurological examination should evaluate balance, reflexes and motor testing in all muscle groups, and sensory testing of the lower extremities, back and chest. Rapid assessment of strength and balance can be made by observing gait, toe-walking, heel-walking, heel-to-toe walking along a straight line and hopping on one foot. Weakness of the lower extremities may be caused by a spinal mass or a central nervous system problem. Sensory changes to light touch along the back and spine may be a subtle sign of an underlying spinal syrinx causing the scoliosis. Upper and lower extremity deep tendon reflexes should be included, as well as the Babinski test. Abdominal reflexes obtained by stroking the four quadrants around the umbilicus in a supine patient (umbilicus moving toward the stroked side is normal) should be completed. Abnormal examination may indicate an intraspinal disorder such as syringomyelia.

A partial list of syndromes and neuromuscular conditions associated with scoliosis

- Cerebral palsy
- Charcot-Marie-Tooth disease
- Poliomyelitis
- Spinal muscular atrophy
- Arthrogryposis
- Duchenne muscular dystrophy
- Congenital hypotonia
- Neurofibromatosis
- Paralysis
- Marfan syndrome
- Ehler-Danlos syndrome
- Myelomeningocele
- Osteogenesis imperfecta
- Achondroplasia

Infantile curves may be associated with neuroaxial abnormalities, plagiocephaly, hip dysplasia, congenital heart disease and mental retardation, and usually (90%) resolve spontaneously (6,7). Juvenile scoliosis, on the other hand, is often progressive and, due to the remaining growth, has the potential for severe trunk deformity and eventual cardiac or pulmonary compromise. If left untreated, curves that reach 30° are almost always progressive (8).

Prognosis

Early-onset scoliosis is a heterogeneous constellation of diseases. Prognosis is linked largely to the co-morbidities and deformity at the time of presentation. This can be linked to the syndromic nature of the presentation, or more importantly, to the curve's impact on thoracic growth and function.

Treatment:

Managing early onset scoliosis is a major challenge. Bracing is of little use in this population. Treatment of early-onset scoliosis is a team-based interdisciplinary care approach. This includes pediatric, genetic, pulmonology, cardiology, anesthesia, surgeon, social work, and physical therapy experts.Consultations with these specialists should include a pre-operative meeting to maximize the medical status of any patient undergoing a complex spinal deformity procedure. The surgical complications should be discussed with the caregiver.

The goals for surgical treatment are to prevent progression and to improve spinal alignment and balance. The hips and shoulders should be level,

and the head over the sacrum while maintaining sagittal alignment.

In Situ Spinal Fusion

Spinal fusion is a procedure performed to stop growth of the spine. It can be done from the back (posterior) or through the chest (anterior). The joints of the spine are removed, and a bone graft is placed; when the bone heals there will be a fusion mass, or one solid piece of bone. The goal is for the many vertebrae of the spine to become one segment and stop growing crooked.

Growing Rods

Most operations that address spinal deformity in the young child work by stopping growth. This may have unfavorable effects on growth of the thorax, lung development, and size of the trunk. The theory of the growing rod operation is to allow for continued controlled growth of the spine. In general, the curve is spanned by one or two rods under the skin to avoid damaging the growth tissues of the spine. The rods are then attached to the spine above and below the curve with hooks or screws. The curve can usually be corrected by fifty percent at the time of the first operation . The child then returns every six months to have the rods "lengthened" approximately one centimeter to keep up with the child's growth. This is usually an outpatient procedure performed through a small incision. However, treatment with growing rods remains a long and difficult therapy for the child.

Instrumentation and Fusion

Definitive spinal fusion is performed to stop growth of the spine and thus achieve permanent correction. This treatment becomes appropriate when the patient has achieved sufficient spinal length and thoracic width and depth that the growth stoppage will not in itself produce thoracic insufficiency.

Posterior fusion provides permanent stabilization in the corrected position .The rigid fixation is achieved by screws, hooks, and wires ("anchors") attached to the spine, usually at multiple sites along the curve, and then rods are attached to the anchors to stiffen the entire area. Often the patient does not need any further external immobilization (cast or brace) if the internal fixation device is felt to be adequate at the time of surgery.

Long Term Results

Several studies have demonstrated a favorable long term outcome to curves treated nonoperatively if the residual curve measures less than forty degrees and there is minimal truncal imbalance.

Similar studies have demonstrated a favorable outcome with individuals who underwent a surgical fusion that left two or more motion segments free at the bottom of the spine.

Long term studies show that large curves of sixty degrees or more have a distinct potential for progression over the ensuing 3-4 decades and that symptoms may develop and require treatment.

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Management and Ensuring Safety of Medical Devices - Bio Medical Conference On 22nd June 2019.

Invited Speaker at ENDODUBAI International Laparoscopy Conference at Dubai on 22nd Feb 2019 Dr. S. Kalyanakumari

CME Programme IMA - Udumalpet Onco Team

Multi Speciality Medical Camp at Ooty on 23.06.2019

CME Programme at Tiruppur by Dr. Dinesh Chidambaram & Dr. Murugananth

CME Programe at Dharapuram by Dr. M. N. Sivakumar & Dr. P. Vivekananthan

GLIMPSE

World Womens Day Health Awareness Talk Programme - M/s. Lakshmi Ring Travellers by Dr. N. Premalatha

World Womens Day Health Awareness Talk Programme M/s. Shanthi Gears Limited by Dr. N. Premalatha

Fire and Safety Awareness at Park College Coimbatore

CME Programme at Gobichettipalayam by Onco Team

June 14th World blood donor day-Inhouse Blood donation camp

Basic Life Support Programme at CF Hospital Oddanchatram

Inhouse Dermatology & Cosmetology Camp By Dr. K. Anita Sudhakaran

CME Programme at Palakkad by Dr. M. Sudhakaran

A NOVEL TECHNIQUE TO MANAGE HIGH GRADE GYNAECOMASIA

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The most common benign breast pathology affecting males is the Gynaecomastia. Even though less troubling most people seek treatment as it causes huge amount of psychological and social discomfort . There are four different grades of gynaecomastia(Simons) amongst these different grades, high-grade gynaecomastia (Simon grade IIb and III) has the problem of skin excess along with enlarged and displaced nipple-areola complex, which cannot be managed with the present methods .

Many different types of surgical techniques have evolved in the past for management of high-grade gynaecomastia. These were ethier aesthetically unappealing with long scars or loosened breast skin envelope. Scar-less techniques like 'subcutaneous mastectomy through a peri-areolar ' and 'liposuction assisted gynaecomastia reduction' is excellent for low-grade (Simon grade I and IIa) gynaecomastia, nevertheless these are not effective when there is a skin excess displacement of nipple areola, as in higher grade gynaecomastia. (grade IIb and III).

Circumareolar skin excision and liposuction technique is the answer to these conditions.

Preoperative marking

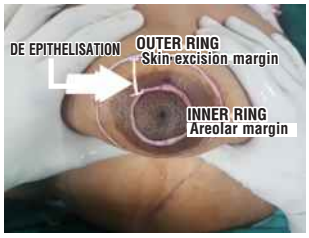
Size of the breast, areola, and position of the nipple are always marked in standing position pre-operatively.

- Marking of Breast Imprint: The breast imprint was marked along Infra mammary fold and the upper limit.Also the extending fat into the axilla was marked •
- Marking of Areola margin (inner ring): In cases with significant increase of areolar diameter, the areolas were marked to be reduced to 2.8-3 cm, The nipple position was roughly marked to mid humerous postion. .
- Marking of skin excess (outer ring): This marking was done in a circular manner, depending on the size and shape of the breast, with a 2-2.2 cm width surrounding the first marking.

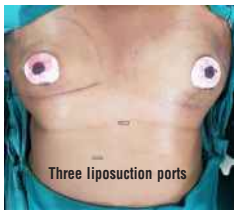
Operative procedure

General anaesthesia with endotracheal intubation is the preferred method. After anaesthesia, tumescent fluid infiltration was done. The infiltration volume was around the expected aspiration volume.

After infiltration is complete, de-epithelisation of the marked area (between the two marked rings) was done in circular manner and liposuction is started with a 3 mm Mercedes Benz cannula through a small stab incision made along the outer lateral margin of the de-epithelised area and one at mid epigastric anea.



Once liposuction was completed, the lateral margin of stab incision for liposuction was extended 2 cms further on either side.Through this window, the redundant portion of the breast tissue was removed by sharp dissection keeping 1.5-2 cm breast tissue under the nipple-areola complex.

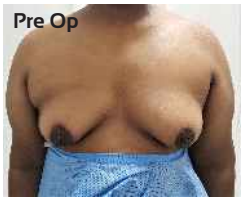


Outer border of the de-epithelised area was sutured by subdermal 3-0 monocryl suture, which gave a purse-string effect and made close contact of the two incision lines. These two lines were further apposed by subcuticular monocryl 4.o.

A suction drain was inserted through a separate stab incision over anterior axillary line and removed after 24 hr. Compressive dressing were applied on table and continued for 6 weeks.

Advantages of the technique.

When it comes to grade III Gynaecomastia with a large skin excess the operating techniques those commonly followed until now results in either an unpleasant long scar or sagging skin envelope (due to only liposuction). This combination of various techniques help us to get the desired results and a satisfied patient.



MANAGEMENT OF SMALL RENAL MASSES –WHERE DO WE STAND ?

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Introduction :

The incidence of primary renal malignancies is increasing, with an estimated over 340,000 new cases and 143,000 deaths worldwide. This rising incidence is driven in large part by the growing use of cross-sectional imaging for often unrelated indications. With a greater proportion of renal neoplasms diagnosed incidentally, there has been a resultant stage migration, such that half of all renal neoplasms are stage I at diagnosis (3).

Surgical extirpation remains the cornerstone of management for renal neoplasms greater than 4 cm in size (4). Conversely, the management of small renal masses (SRMs), defined as a renal neoplasm 4 cm or less in greatest dimension (5), remains more nuanced. This is driven in part by the approximately 20% likelihood of benign pathology among SRMs (6), the low metastatic potential of SRMs (7), and increasing evidence supporting the efficacy and safety of focal ablation and active surveillance in appropriately selected patients.

Material and Methods :

We report a one such case of SRM, a 35 year old female patient with no co-morbities. On evaluation for chest discomfort was incidentally found to have right renal mass lesion on CT. Contrast enhanced CT showed 3.8cm x 3.5cm x 3.7 cm right sided lower polar (partly exophytic and partly endophytic) renal mass lesion. The lesion was found to be confined to the kidney, with no renal vein or IVC involvement and no perinephric involvement. Opposite side kidney was normal. There was no evidence of abdominal lymph adenopathy. Metastatic work up did not reveal any evidence of metstatasis

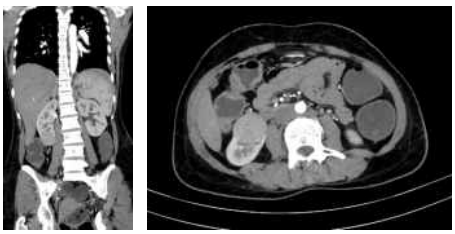
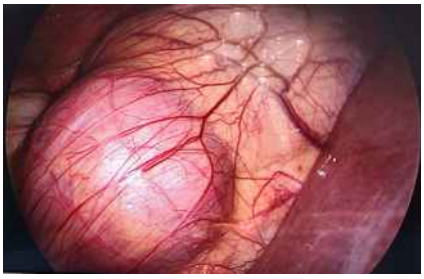
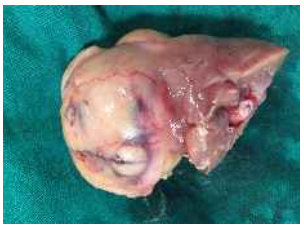


Fig: CT Images showing Right lower polar exophytic Mass lesion.

After initial workup, patient underwent Laproscopic Right Partial Nephrectomy. HPE was suggestive of Clear cell RCC(Furhman`s grade 2) with clear surgical margins. Patients recovery was smooth



Pic 1: Intraoperative Picture showing exophytic right lower polar mass lesion



Pic 2 : Post – operative pictures showing tumor with clear surgical margins

Discussion:

Renal cell carcinoma (RCC) comprises approximately 85% of primary renal malignancies (8). Over half of renal masses are now diagnosed incidentally on cross-sectional imaging (9), with 60% organ-confined (cT2bN0M0 or less) at diagnosis (3). Among SRMs, 95% are localized at diagnosis (7) with most demonstrating slow growth kinetics (10). The likelihood of malignancy in a solid lesion increases with size, however up to 20% of neoplasms 4 cm in diameter are benign on surgical pathology, with a higher incidence of benign pathology among smaller lesions (6). Furthermore, only about 20% of malignant lesions 4 cm or smaller are high-grade on surgical pathology. Based upon these characteristics, SRMs are optimal candidates for active surveillance in the appropriately-selected patient. As the risks of perioperative morbidity and long-

term chronic kidney disease (CKD) following partial or radical nephrectomy have become better understood, active surveillance of SRMs has been integrated into the contemporary management paradigm.

Diagnostic work-up

While microscopic hematuria (greater than three red blood cells per high power field) (11) may be a harbinger of urologic malignancy, only a minority of patients with a cortical renal neoplasm exhibit microscopic hematuria on urinalysis (12). In fact, SRMs are commonly diagnosed incidentally on abdominal ultrasound (US) or computed tomography (CT) obtained for unrelated conditions. Thin-slice, contrast-enhanced CT is the preferred imaging modality to characterize SRMs, allowing accurate size determination, assessment of baseline attenuation (for example, identifying fat within angiomyolipomas), evaluation for enhancement suggestive of malignancy, characterization of anatomic relationships between the neoplasm and adjacent structures (such as the renal hilum, collecting system, and abutting organs), and evaluation of the contralateral kidney. Magnetic resonance imaging (MRI) can be used if iodinated contrast is contraindicated, or to better characterize complex cystic masses. The risk of malignancy of cystic masses can be estimated based on radiographic appearance using the Bosniak classification system (13). Cross-sectional abdominal imaging is also necessary for staging purposes, allowing identification of tumor extension into sinus or perinephric fat, tumor thrombus, and retroperitoneal lymphadenopathy. Chest radiography completes staging in the asymptomatic patient.

Management approach

Several SRM management options exist, including active surveillance, focal ablation, and surgical extirpation in the form of radical or partial nephrectomy. Selecting the appropriate management option requires careful consideration of patient and tumor characteristics (Table 1). Additionally, percutaneous renal mass biopsy has emerged as a useful diagnostic tool in guiding management, especially when considering active surveillance.

Patient and tumor characteristics to consider in guiding management of small renal masses

Active surveillance	Older patient at high risk of competing-cause mortality (multiple comorbidities, short life-expectancy)	Young, healthy patient (long-term oncologic safety of surveillance is unproven, significant ionizing radiation exposure with periodic imaging)
	Severe renal dysfunction with risk of requiring hemodialysis after intervention	Non-compliant patient unwilling to complete necessary radiographic imaging
	Patient refuses intervention	–
	Hereditary RCC syndrome with neoplasm <3 cm (except syndromes associated with aggressive neoplastic behavior)	–
Focal ablation	Small, peripheral neoplasm	Young, healthy patient (long-term oncologic safety is unknown)
	Patient who is a poor surgical candidate who desires treatment	Hilar mass (abutting vessels or collecting system)
	Patient desiring treatment who refuses surgery	Larger renal mass
	–	Non-compliant patient unwilling to complete necessary follow-up radiographic imaging
Partial nephrectomy	Solitary kidney	Coagulopathy
	Pre-existing CKD	Complex anatomy
	Bilateral tumors	Non-compliant patient unwilling to complete necessary follow-up radiographic imaging
	Hereditary RCC syndrome	–
	Simple tumor anatomy	–
Radical nephrectomy	Complex tumor in setting of normal contralateral kidney	High risk of post-operative CKD or end-stage renal disease
	Older patient with comorbid conditions at elevated perioperative risk with partial nephrectomy	–

Table 1: Indications an contra indications for SRM management moalities.

The role of percutaneous biopsy

Traditionally, percutaneous biopsy was not routinely used to guide the management of renal neoplasms due to high non-diagnostic rates (30%) and low specificities (30–60%) (14). Unfortunately, abdominal CT imaging alone has suboptimal specificity (70–80%) and sensitivity (20%) for malignant diagnoses, as well (14). Furthermore, cross-sectional imaging cannot adequately distinguish different RCC subtypes (15). Given these drawbacks to CT imaging, there has been renewed interest in percutaneous renal mass biopsy for guiding management.

Contemporary series demonstrate significantly improved rates of diagnostic biopsies (around 90%) and agreement with surgical pathology (about 92%) (16,17). Furthermore percutaneous biopsy has a low complication rate (<5%) with few major complications (<1%) (15). The risk of tumor tract seeding is extremely low, estimated at less than 0.01% (15). Together, these characteristics make percutaneous biopsy a useful tool in selecting appropriate candidates for focal ablation or active surveillance. Furthermore, risk factors for non-diagnostic biopsy have been identified and include neoplasm size under 2 cm, presence of a cystic component, and increased skin-to-tumor distance; evaluating for these characteristics can help identify patients most likely to benefit from percutaneous biopsy (16,18).

Active surveillance

Active surveillance first emerged for the management of renal masses in older, comorbid patients who were felt to be poor surgical candidates. Observational studies demonstrate

slow mean annual tumor growth rates(0.1–0.3 cm per year), with smaller neoplasms demonstrating the slowest growth (10,19). These kinetics make active surveillance appealing for SRMs, especially among older patients or those with competing mortality risks. Before selecting active surveillance, several patient factors and tumor characteristics must be considered (Table 1). The risk of morbidity or mortality from an untreated renal mass on surveillance must be weighed against those of surgical intervention. Active surveillance requires periodic imaging resulting in ionizing radiation exposure from CT scans and an inherent risk of secondary malignancy. This risk is mitigated with the use of ultrasonography, especially once stable tumor size has been demonstrated on serial imaging studies. Active surveillance in young healthy patients is typically reserved for instances in which benign pathology has been confirmed on percutaneous biopsy, or in the setting of a hereditary RCC syndrome. Surveillance is avoided in the non-compliant patient, as those lost to follow-up risk disease progression beyond a curable stage.

Focal ablation

Focal ablation is a useful approach to treating elderly and extensively comorbid patients, especially for peripheral SRMs located away from vital structures. The American Urological Association (AUA) guidelines list focal ablation as an option for any T1a or T1b renal neoplasm and a recommendation in the setting of comorbidities conferring high surgical risk (4). Ablation of renal masses is performed by placing probes into lesions percutaneously using cross-sectional imaging guidance or laparoscopically with US guidance. Posterior lesions are typically amenable to a percutaneous approach, whereas anterior neoplasms abutting adjacent organs are typically approached laparoscopically. Hydrodissection has been used by some experienced interventional radiologists to ablate neoplasms abutting adjacent structures such as the colon.

Multiple ablative techniques exist in practice, including radiofrequency ablation, microwave ablation, and cryoablation (21). Specific tissue effects vary between ablative modalities, but the goal of each is to achieve necrosis of the entire SRM and a very thin rind of adjacent normal renal parenchyma—essentially a negative margin. Regardless of ablative technique, focal ablation is a well-tolerated procedure with a 5–18% complication rate (22,23). Several retrospective studies have also reported shorter hospitalization, lower estimated blood loss, and less renal functional decline after focal ablation compared to partial nephrectomy (22,23).

To date however, no randomized prospective trials have compared ablation modalities or compared ablation to surgery. Though based on retrospective studies limited by selection bias and with shorter follow-up, a meta-analysis found higher recurrence rates with focal ablation compared to partial nephrectomy (24). Challenging the interpretation of this literature however, are varying definitions of recurrence, with some studies using radiographic criteria while others consider only recurrences that are biopsy-proven. Limitations of radiography in identifying true post-ablation recurrences only further complicates the interpretation of these findings (25).

While single institutional experiences demonstrate excellent cancer-specific survival, such results must be interpreted within the context of marked patient selection bias (23). Prospective randomized trials comparing partial nephrectomy to tumor ablation are necessary to accurately compare these two treatment modalities and better understand the long-term efficacy of ablation in younger patients. This is especially important in light of evidence suggesting surgical salvage of post-ablation recurrence is technically challenging, often resulting in radical nephrectomy (26).

Surgical extirpation

Surgical extirpation via partial or radical nephrectomy remains the standard of care for cT1a neoplasm, as outlined in the AUA guidelines (4). Surgery should be strongly considered in healthy patients at low risk of competing-cause mortality, especially younger patients in whom repeated ionizing radiation exposure carries inherent risk (4,27). Partial nephrectomy is recommended when feasible, due to the lower risk of CKD with nephron-sparing surgery (4,28). By preserving renal function, it is believed that partial nephrectomy confers a lower risk of subsequent cardiovascular morbidity and overall mortality when compared to radical nephrectomy.

Partial vs. radical nephrectomy

Radical nephrectomy was traditionally the gold-standard therapy for achieving optimal oncologic outcomes, while partial nephrectomy was reserved for patients with an anatomic or functional solitary kidney, bilateral tumors, hereditary RCC syndromes with risk of metachronous tumors, and patients with medical renal disease at elevated risk of CKD following radical nephrectomy (27). In the contemporary era, partial nephrectomy has become standard in the management of cT1 tumors, when feasible. In addition to conferring a lower risk of long-term CKD (28), partial nephrectomy has been associated with lower rates of cardiovascular events and overall mortality in multiple retrospective studies (28). However, these studies have been scrutinized for limitations related to their retrospective design, including the biases inherent to patient selection.

To date, only one prospective trial has randomized patients to partial or radical nephrectomy—the European Organisation for Research and Treatment of Cancer (EORTC) trial 30904. Patients with a solid renal neoplasm 5 cm or smaller were enrolled and with a median 9.3 years follow-up demonstrated similar 10-year overall survival between patients undergoing radical nephrectomy (81.1%) and partial nephrectomy (75.7%) (29). Using an intention-to-treat analysis, radical nephrectomy was demonstrated to be superior to partial nephrectomy in overall survival, despite the lower incidence of CKD in patients undergoing partial nephrectomy. Oncologic outcomes were similar between the two groups, though only 12 cancer-related deaths occurred in total. This trial has been criticized for several limitations, including failure to meet accrual goals and the significant number of patients lost to follow-up. Despite these limitations, this remains the only prospective randomized trial comparing outcomes between partial and radical nephrectomy. The lack of survival benefit with partial nephrectomy contradicts findings of prior retrospective studies and has led some in urology to question wide-spread adoption of partial nephrectomy in the absence of a strong indication (Table 1).

EORTC 30904 also showed a similar incidence of cardiovascular mortality in patients undergoing partial nephrectomy (9.3%) and radical nephrectomy (7.3%) (29). This may reflect differences in the natural history of medical and surgical causes of CKD. Lane et al. recently demonstrated that among patients undergoing partial or radical nephrectomy, those with medical renal disease who developed post-operative CKD were at higher risk of progressive renal function decline and mortality compared to patients without medical renal disease who developed post-operative CKD due to nephron-loss alone (30). As such, the increased risks faced by patients with predominantly medical causes of CKD may not apply to patients developing post-operative CKD from surgical nephron-loss (31).

Compared to open surgery, a minimally-invasive approach to partial nephrectomy appears beneficial, with evidence suggesting it has lower rates of perioperative morbidity and blood transfusion, as well as a shorter length of stay (33). However, these findings may be impacted by selection bias and must be interpreted cautiously. The decision to pursue partial or radical nephrectomy via an open or minimally-invasive approach should be made jointly between the surgeon and patient, taking into account patient factors and preference, tumor characteristics, surgeon experience, and available resources.

The current SRM management paradigm

The oncologic outcomes of partial or radical nephrectomy in the treatment a SRM are excellent. The management paradigm for SRMs has evolved to include active surveillance and focal ablation out of a growing recognition that not all SRMs are clinically relevant, especially among older patients at a high risk of competing-cause mortality. Indeed, approximately 20% of SRMs are benign, while many malignant neoplasms under 4 cm demonstrate indolent behavior that makes them amenable to active surveillance. Furthermore, partial and radical nephrectomy carry risks of perioperative complications that must be considered when counseling patients.

Among surgical management options, partial nephrectomy is associated with a lower risk of CKD and, given the association between CKD and overall mortality, has been believed to confer a survival benefit relative to radical nephrectomy. However, the only randomized trial to compare

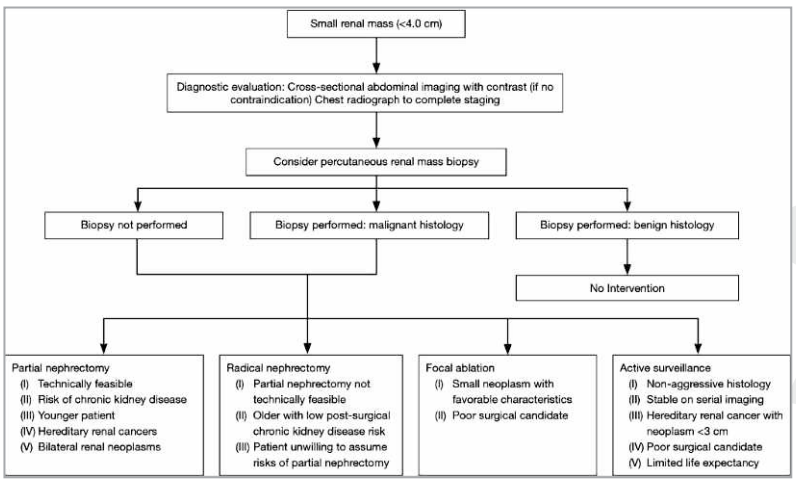
partial and radical nephrectomy demonstrated that despite partial nephrectomy being associated with a lower incidence of CKD, it was actually associated with worse 10-year overall survival (29). These contradictory findings may be secondary to differences in the progression of renal functional decline in patients with surgically-induced CKD compared to medical CKD (30). Therefore, an individual patient's risk of developing CKD following partial or radical nephrectomy, as well as their overall clinical condition, must be considered when choosing a management approach.

In counseling the patient with a SRM several patient and tumor characteristics should be assessed before choosing the most appropriate management option (Table 1). Percutaneous renal mass biopsy is a useful tool that should be considered in cases where biopsy results will guide subsequent management. Active surveillance is considered in older patients at high risk for competing cause mortality, but among young healthy patients is reserved for only those in whom benign pathology has been confirmed on percutaneous biopsy or in those with a hereditary RCC syndrome.

Among patients considered for definitive management, focal ablation is typically reserved for peripheral neoplasms distant from critical structures in patients at high surgical risk or who refuse surgery. When selecting between partial and radical nephrectomy, one must first determine whether an absolute indication for nephron-sparing surgery is present (Table 1). Partial nephrectomy has been increasingly adopted, even among patients with a normal contralateral kidney due to the reduced risk of long-term CKD with nephron sparing. Though EORTC 30904 found no survival benefit to partial nephrectomy, many in the Urologic community favor this option for young patients with long life expectancy and patients at risk for CKD, such as those with medical renal disease. Radical nephrectomy remains an excellent option for patients with complex renal tumors or difficult pelvicalyceal anatomy, and among older patients with co-morbid conditions who may not tolerate potential perioperative complications.

Conclusions

SRMs represent a heterogeneous group of neoplasms, of which only a minority demonstrate aggressive clinical behavior. There is emerging data demonstrating the safety of active surveillance for these entities, though further research is required to ensure satisfactory outcomes are maintained in the long-term. Percutaneous renal mass biopsy has emerged as a useful diagnostic tool to aid in selecting candidates most appropriate for surveillance. Minimally-invasive ablative therapies can be beneficial when surgical risk is high. Among patients selecting surgical intervention, partial and radical nephrectomy provide excellent oncologic outcomes. Though partial nephrectomy has a demonstrated benefit in preserving renal function, there remains ongoing controversy regarding the significance of this benefit with respect to overall survival. Absolute indications for nephron-sparing surgery remain well-defined. For patients with long life expectancy and tumors amenable to nephron-sparing surgery, partial nephrectomy should receive strong consideration.



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Dr.Vinoth Sankarasubramanian, MBBS, MS (Ortho).,
Consultant Orthopaedic Surgeon

Completed MBBS in 2011 from Tirunelveli Medical College and MS Ortho in 2016 from Madras Medical College. He was a Consultant Orthopaedician since 2016 to 2018 at Seventh Day Adventist Hospital, Ottapalam, Palakkad, Kerala. Now he joined as a Consultant Orthopedic Surgeon at Royal Care City Unit.

Dr. Saranya.V, MBBS, MD (Path), DNB , Post Doctoral Fellowship (Oncopathology)., Tata Medical Center.
Consultant Pathologist

Completed MBBS from Mysore Medical College & Research Institute, Karnataka in 2012. She has pursued MD (Pathology) from Coimbatore Medical College and Hospital, Coimbatore (2013-2016). She has worked as a Consultant Pathologist at SKS Hospitals, Salem for 1 year.

Later She has accomplished Post Doctoral Fellowship (Oncopathology) at Tata Medical Center, Kolkata and has joined as a Consultant Pathologist at Royal Care.

Dr.P. Janarthanan, MBBS, MD (Cardio).,
Consultant in Master Health

Completed MBBS from Stanley Medical College, Chennai in 2010. Then did MD(cardiology)- 3 years(2011-2014) of General Cardiology from Yerevan State Medical University, N1 Hospital, Armenia from December 2014 to May 2017 worked as Associate Consultant in Narayana Hrudayalaya Emergency Cardiac Center, Bangalore as a Junior Consultant (May 2017- May 2018) in Tathagat Heart Center, Mallige Hospital Bangalore from May 2018 - May 2019 as an associate consultant in Narayana Hrudayalaya Heart Center & M S Ramaiah Medical College, Bangalore. Now he has joined as a Consultant in Master Health at Royal Care.

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