UAKON 2000
Cochin

SOUVENIR

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UAKON 2000

Cochin

21 & 22 October 2000

(Hosted by Cochin Urology Club)

SOUVENIR

Editor

DR.H.KRISHNA MOORTHY

CONTENTS

Dr. Krishna Moorthy H
Organising Secretary, UAKON 2000
Consultant Urologist
Lourdes Hospital
Kochi 682 012

1 October 2000

EDITORIAL

We, members of the Organising Committee, welcome you to the first UAKON of the Millennium.

The last decade has seen vast advancements in the field of Urology. Urologists are now able to reach every nook and corner of the urinary system through minimal or no incision, causing least trauma to the patients. We are proud that urologists from Kerala have contributed enormously to the development of Urology in the country. We are one among the oldest State Associations in India and the first to have a website for the Association. Many of our members had been stalwarts at the national, if not in the international scenario.

The meetings of the UAK traditionally attract most of the urologists from Kerala and neighbouring parts of the country. The ambience is good, scientific fiesta enlightening and each moment of the conference memorable. Kochi has been exceptional in its hospitality. We are sure that you will cherish sweet memories of this conference also for a long time to come.

Keeping in line with the past tradition, we are bringing out this souvenir, in connection with the UAKON. We have endeavoured to make this booklet worthy of preservation by including informative and instructive articles by doyens in the field. We earnestly hope that each one of us, who goes through the articles, benefits a point or two.

We place on record our gratitude to all the contributors, advertisers and advisers, who have provided immense help and guidance to bring out this souvenir. We express our thanks to all the personnels who have toiled hard to make the conference a grand success. Last, but not the least, we are truly grateful to Mr.Sleeba Varghese of Fine Frames for bringing out this beautiful booklet in a good outfit at the right time.

KRISHNA MOORTHY

Raj Bhavan
Thiruvananathapuram

2nd June 2000

MESSAGE

I am happy to know that the Urological Association of Kerala is organising its XIV Annual Conference (UAKON 2000) at Kochi on the 21st and 22nd October 2000, and that a souvenir is being published to mark the occasion.

I hope the urologists attending the conference will discuss the progress we have so far made in the field, and update the current knowledge and practice of urology through their discussions and interaction.

I wish the conference and the souvenir all success.

Sd/-

SUKHDEV SINGH KANG

Dr.Joseph Thomas
Secretary, UAK
Professor of Urology
Kasturba Medical College
Manipal 576 119

15 September 2000

Dear Friends,

It has always been a pleasure for me to attend the UAKON meetings. UAKON 2000, the first Annual Conference of the millennium has come to the commercial capital of Kerala - the beautiful city of Kochi. Let me welcome all of you to the XIV Annual Conference of the Urological Association of Kerala. This is the third time that Kochi is hosting the Annual Conference.

UAK has always been a vibrant state body - a trend setter for the many state bodies that came later. It has always been a state body which has gone beyond the boundaries attracting urologists from the neighbouring states. This is because of the high standards of the scientific deliberations during the conferences, which has benefited one and all. I am happy to say that all the practising urologists in Kerala are members of this great body. I feel proud to be a member of this association. Let me urge all the members to take an equally active role at the Zonal and National levels also.

I express my deep sense of gratitude to the Organising Committee who has spared no pains to make this conference a big success. My special thanks are due to Dr. Krishna Moorthy who has also helped me tremendously in planning the scientific aspects of the conference. Let me wish all the delegates and the accompanying persons a very nice and fruitful stay in Kochi.

Sd/-

JOSEPH THOMAS

Dr. Thomas Thachil
President, UAK
Dhanya, Convent Road
Angamally

24 August 2000

Dear Dr. Krishna Moorthy,

It is indeed a great pleasure to know that Cochin Urology Club is hosting the Annual Conference of UAK on 21 and 22 October 2000 at Kochi.

The city of Kochi - the "Queen of the Arabian Sea", located almost in the middle of Kerala, is the right place for holding the Annual UAK Conference. I am quite confident that under your able stewardship, and with the guidance of very senior members there, this is going to be a very memorable event. The number of delegates attending, I am sure will be large, and the academic feast sumptuous.

I am glad that you are bringing out a souvenir in this connection. It will certainly be a worthy record of the proceedings and a good memento to keep.

I wish yourself, all the delegates and the conference every success.

Sd/-

THOMAS THACHIL

Patron

Dr. Samuel J

Organising Committee-UAKON 2000

Sitting from L to R
Dr. Augustine Komaranchath
Dr. Krishna Moorthy H
Dr. George P Abraham
Dr. Raju Abraham

Standing from L to R
Dr. Mathew J Mangat
Dr. Vijayan R
Dr. Benjamin IC
Dr. Basil Elias
Dr. Balachandran C
Dr. (Col) Raveendran Nair K

UAKON 2000 - PROGRAMME

21 October 2000

08.00 AM : Registration

09.00 - 09.30 AM : Guest Lecture I
Chairpersons: Dr. Antony PG, Thrissur
Dr. Biju Mathews,

Mavelikkara

Current Concepts in the Management of Testicular Tumours
Dr. Gangadharan VP, Thiruvananthapuram

09.30 - 10.15 AM : INAUGURATION
10.15 - 10.30 AM : Coffee Break
10.30 - 11.00 AM : Annual UAK Oration
Chairpersons: Dr. Thomas Thachil, Kangazha
Dr. Joseph Thomas, Manipal

Surgical Complications in Live Kidney Transplantation - My Experience
Dr.Vijayasankar, Madurai

11.00 - 11.30 AM : Guest Lecture II
Chairpersons: Dr. Hamza Thayyil, Kozhikode
Dr. Sunil Jacob, Kolencherry

Management of Acute Renal Failure
Dr. Unni VN, Kochi

11.30 - 12.15 PM : Free Papers
Chairpersons: Dr. Baby N Mathew, Kollam
Dr. Madhavan RP, Kollam

1. **A Retrospective Analysis of Long Term Evaluation of Carcinoma Prostate after Orchiectomy**
Santhosh P Varghese, Felix Cardoza, Sulaiman E, Medical College, Kozhikode
2. **Captopril Renogram in Hydronephrosis**
Jacob Cherian, Appu Thomas, Suresh Bhat, Dharmarajan, George Joseph, Medical College, Kottaya
3. **CT Guided FNAC in Renal Neoplasms - Revisited**
Krishna Moorthy H, Pushpangathan VS, Lourdes Hospital, Kochi
4. **Renal Transplantation and its Complications - Our Experience**
Ginil Kumar, Pisharady R, Mohanan, Rajan SP, Felix Cardoza, Sulaiman E, Medical College, Kozhikod
5. **Population Based Screening for Carcinoma Prostate - a Pilot Study**
Haris CH, Satheesh Kumar G, Albert AS, Medical College, Thiruvananthapuram

12.15 - 12.50 PM : Black Pearls
Chairpersons: Dr. Ashok Pandit, Mangalore
Dr. Chandrasenan Nair, Alapuzha

Participants
1. Dr.Joseph Thomas, Manipal
2. Dr.Krishna Moorthy H, Kochi
3. Dr.Darwin Therattil, Thrissur

12.50 - 01.00 PM : *Chairpersons : Dr. Nazer M, Kozhikode*
Dr. Nazeer Ahamed, Thrissur

History of Urology
Dr.Augustine Komaranchath, Kochi

01.00 - 02.00 PM : Lunch
02.00 - 02.30 PM : How I Did it
Chairpersons : Dr.Rajesekharan AK, Kottiyam
Dr. Venuchandran, Perinthalmanna

Participants

1. Dr. Subramoniam, Madras
2. Dr. Abdul Azeez, Kozhikode

2.30 - 03.00 PM : Video Session
Chairpersons: Dr. Dineshan KV, Kozhikode
Dr. Ajith Bharathan, Pandalam

1. **Prostatic Volcano**
Prakash Sharma, Sanal Varghese, George P Abraham, Medical Trust Hospital, Kochi
2. **Retroperitoneoscopic Ueterolithotomy**
Sathish Kumar, Jayachandra Babu, Caritas Hospital, Kottayam
3. **Iatrogenic Urethral Injury at Catheterisation**
Sanal Varghese, Prakash Sharma, George P Abraham, Medical Trust Hospital, Kochi
4. **Laparoscopic Repair of Bladder Injury**
Antony PG, West Fort Hospital, Thrissur

03.00 - 03.30 PM : Debate
Moderator: Dr. Appu Thomas, Kottayam

Stent Dilemma in ESWL

Participants

Kasturba Medical College, Manipal
Elite Mission Hospital, Thrissur
Medical College, Kottayam
Lourdes Hospital, Kochi

03.30 - 03.45 PM : Coffee Break
03.45 - 04.15 PM : Poster Session
Chairpersons: Dr. Darwin Therattil, Thrissur
Dr. Sreenivas Shenoy, Thrissur

1. **Renal Malignant Fibrous Histiocytoma**
Sanal Varghese, Prakash Sharma, George P Abraham, Medical Trust Hospital, Kochi
2. **Medical Therapy of Radiolucent Staghorn Calculus with Hyperuricemia**
Sanjeevan KV, Suresh Pandalai, Raghunath SK, Amrita Institute of Medical Sciences, Kochi

4. **Rare Congenital Anomalies of Urogenital Tract - Spectrum of 8 Cases**
Pushpangathan VS, Krishna Moorthy H, Lourdes Hospital, Kochi

5. **Recent Embolic Renal Infarction Considered Contraindication for Coronory Angioplasty-Repo**
Sanjeevan KV, Suresh Pandalai, Amrita Institute of Medical Sciences, Kochi

6. **Uretero-sigmoid Fistula - a Rare Complication of Vaginal Hysterectomy**
Haris CH, Mahesh K, Satheesh Kumar G, Albert AS, Medical College, Thiruvananthapuram

7. **Stenting for Long Segment Urethral Stricture**
Sathish Kumar, Caritas Hospital, Kottayam

04.15 PM : Annual General Body Meeting
07.30 PM : **Banquet** (Roof Top Pool Side, Hotel Abad Plaza, Kochi)

22 October 2000

08.30 - 09.30 AM : *Symposium*
Moderator: Dr. Albert AS, Thiruvananthapuram

Controversies in the Management of Invasive TCC Bladder

09.30 - 10.15 AM : Uroquiz
Quiz Master: Dr. Suresh Bhat, Kottayam

10.15 - 10.30 AM : Coffee Break

10.30 - 11.00 AM : Guest Lecture III
Chairpersons: Dr. Mohan P Sam, Alapuzha
Dr. Unnikrishnan, Kozhikode

Gynecological Endoscopic Surgery - Changing Trends
Dr. Paul PG, Kochi

11.00 - 11.15 AM : Review Paper Presentation
Chairpersons: Dr. Sivaramakrishnan P, Thiruvananthapu
Dr. Mathew J Mangat, Kochi

Management Strategies in Upper Ureteric Calculi
Ramadas P, Kozhikode

11.15 - 12.15 PM : Invited Video Session
Chairpersons: Dr. Sreedharan Unni, Kozhikode
Dr. Harigovindan P, Kozhikode

Is Laparoscopy the Next Revolution in Urology
Dr. Vijayan R, Kochi

PCNL in Difficult Situations
Dr. George P Abraham, Kochi

Ureteroscopic Management of Upper Ureteric Stones
Dr.Kandasamy SV, Coimbatore

Management of Ejaculatory Dysfunction
Dr. Murali TR, Madurai

12.15 - 01.15 PM : Free Papers

Chairpersons: Dr. Vasudevan S, Thrissur
Dr. Chitra Thara, Thiruvananthapuram

1. **Surgical Complications of Renal Transplantation in 500 Patients**
   Sanal Varghese, John Abraham, Prakash Sharma, George P Abraham, Medical Trust Hospital, Kochi

2. **Vascular Access for Hemodialysis - Our Experience**
   Suresh Pandalai, Sanjeevan KV, Raghunath SK, Vinod KV, Amrita Institute of Medical Sciences, Kochi

3. **Renal Failure in Carcinoma Prostate - Management Strategies**
   Natarajan K, Joseph Thomas M, Sasidharan K, Kasturba Medical College, Manipal

4. **Intracavernosal Injections - My Experience**
   Harigovindan P, Medical College, Kozhikode

5. **Pot Pouri of Rare Renal Tumours**
   Suresh Bhat, Appu Thomas, Dharmarajan, George Joseph, Jacob Cherian, Medical College, Kottayam

6. **Comparison of CT Staging with Peroperative Staging in Renal Cell Carcinoma = A Study**
   Georgi Mathew, Albert AS, Syam K Ramesh, Venugopal G, Medical College, Thiruvananthapuram

01.15 - 01.30 PM : Valedictory Function
01.30 PM : Lunch

Posterior Urethral Valves - A Brief Over View

Fulgration of the posterior urethral valves and restoration of unimpeded urinary flow in the neonate continues to remain the first objective of the clinician. However, the fact that this alone constitutes only one of the components of the treatment strategy and one has to reckon with many other facets of prenatal obstruction has not been realized emphatically by many practicing consultants. I have discerned a general tendency among the consultants in this country to let the children fend for themselves after the fulgration of the valves on the unacceptable premise that whatever is done cannot retard the inexorable progression towards renal failure and limited survival on renal replacement.

I believe that despite formidable array of adverse factors, a fair number of children with posterior urethral valves could be salvaged through appropriately conceptualized treatment strategies. Advent of latest generation of paediatric urethrocystoscopes of small dimension (4.5 Fr.) permits one to gain access to most of the neonatal urethras with relative ease and fulgrate the valves. The quantum of primary diversions, therefore, has significantly dwindled. In the current setting, to my mind, only hypercatabolic situations, perhaps, constitute a genuine indication for a primary diversion. In case a diversion warranted, my preferred choice is always a classical vesicostomy. This form of diversion provides excellent drainage and drastically reduces intravesical pressure and thus aids upper tract resolution. The ease with which vesicostomy could be structured and undone remains its principle advantage. The choice of diversion to some extent is dictated by the morphological configuration of the bladder and ureters. A thick and severely hypertrophic bladder will not lend itself comfortably to vesicostomy. Similarly, relatively straight ureters make a loop ureterostomy difficult. I feel that some of the diversions such as end-ureterostomy and defunctioning ureterostomy, though still depicted in text books, are obsolete and violates sound urological principles. Sober's ureterostomy and ureteropelviostomy is a form of upper tract urinary diversion with good urological sense, but the time consumed to perform it bilaterally in hypercatabolism situation is the main deterrent for its frequent application. I reiterate that in the current setting a primary urinary diversion in posterior ureteral valves is resorted mostly in hypercatabolic situation and when indicated a vesicostomy is the pre eminent choice. I most assertively decry simultaneous diversion and fulgration of valves since that exercise invites urethral stenosis.

Valve fulgration and subsequent reduction in bladder pressure engineers resolution of dilated upper tracts in good percentage of cases. However, one should promptly identify those cases which require ureteral reconstruction and reimplantation. Many tend to overlook an obstructive vesicoureteral junction of an organic type with both fibrotic and ischaemic components. These units will never resolve and always require a surgical correction. One should intuitively discern those "irreversible bladder" with meager compliance which would require subtotal excision and augmentation. A skillfully tailored ureter should never be tethered to such irremidable bladder.

DR. SASIDHARAN K
Professor & Head, Department of Urology
Kasturba Medical College & Hospital, Manipal

There are indeed many related bothersome issues which one has to reckon with when conceptualizing management of posterior urethral valves. These include associated renal dysplasia, ultrastructural changes of the ureter, bladder dysfunction and bladder morphology.

Dysplasia is induced by early intrauterine bladder outflow obstruction resulting from the presence of high luminal pressures during differentiation of metanephric blastema. Many current studies are directed towards quantitative analysis of the dilated ureter of childhood and ultrastructural characteristics of collagen tissue in normal and congenitally dilated ureter. The role of the Renin-Angiotensin system in disorders of the urinary tracts is also being evaluated. Modification of bladder structure in response to outflow obstruction has also elicited interest. There is strong suggestion that the tissue matrix ratio of collagen to smooth muscle in the dilated ureter could influence the surgical outcome of ureteral remodelling and reimplantation. It is presumed that the type 3 collagen, a less distensible fiber, may play a role in the pathophysiology of refluxing megaureters and contribute to the lower survival success in the reimplantation of refluxing megaureters.

Current Surgery for Epispadias

The principles of penile repair described by Cantwell and modified a 100 years later by Ransley have considerably improved penile reconstruction in epispadias. It is now generally expected that the patient with epispadias should live a reasonably normal life including marriage and parenting. This expectation demands greater attention to the functional and cosmetic aspects of genital repair.

Goals of Penile Repair

1. Good cosmetic outcome
2. Functional ventral neourethra
3. Adequate erectile function

Components of Penile Deformity

The extrophy-epispadias penis is short, bent forwards with urethral meatus short and on the dorsum. However, it is now known to be much more complex than thought - "Not just hypospadias-chordee on the opposite side". Therefore surgical techniques used to repair hypospadias were not successful when applied to epispadias most of the time. Understanding all components of extrophy epispadias penile abnormality is key to success.

1. Short penile length: The corpora are intrinsically short and angulated upwards.

2. Abnormality of pubic bones: The pubic symphysis is split where the proximal corpora attach - such that several centimeters of corpora are spread over the separation. If this was the sole cause of penile shortening the better approximation of pubic symphysis should allow approximation of several centimeters of corpora and thereby increase penile length. This was not to be because the orientation of inferior pubic rami and attachment of deep parts of corpora are unlike those of normal males.

3. Abnormal dorsal curvature is due to the abnormal intrinsic curvature of the corpora.

Surgical Procedure

Although penile lengthening is not a realisable goal, straightening of the penis can be achieved by corporal rotation. Cantwell-Ransley technique aims at achieving this. The basic concept of straightening a curve is to lengthen the concave side or shorten the convex side. In epispadias, the penis is short and hence lengthening the concave side is the preferred approach.

Another approach involves rotating the corpora so that the curvature is "utilised". Rotating the concave side of each corpus medially results in downwards angulation of the penis. This procedure was first described by Cantwell in 1894. An important modification to this procedure, caverno-cavernostomy, was described by Ransley.

DR. APPU THOMAS
Professor & Head, Department of Urology
Medical College Hospital, Kottayam

Cantwell Ransley Epispadias Repair

Skin incision parallel to the urethral plate to give a strip of 15-20 mm wide is made. This is dissected free of corporal attachment and rolled over a 10F catheter to form a neourethra. Medial rotation of corpora eliminated dorsal chordee. This rotation is secured by caverno-cavernostomy. It is important to construct caverno-cavernostomy at the level of maximum angulation on the penis. The transverse incision at the maximum concavity will open into a diamond shape and two diamond defects are approximated as the corpora are rotated medially.

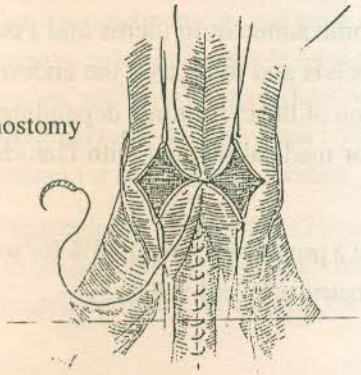
Mitchell Technique

Mitchell and Bagli recently reported a modification which incorporates separation of urethral plate along with complete disassembly of phallus into separate hemicorporeal glandular bodies. This technique makes use of the separate blood supply and neovascular innervation of each hemicorporeal glandular body and proximal urethral plate.

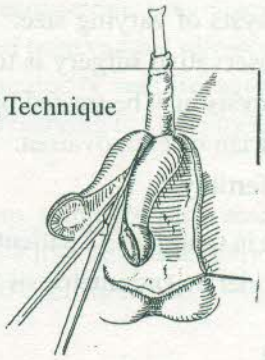
Procedure: The urethral plate is mobilized completely. The neourethra is tubularised over a catheter. The two hemicorporeal glandular bodies are separated in the midline. The neourethra is transferred ventral to the split corpora which are then rotated to correct the dorsal chordee.

Results of Mitchel's techniques are found to be satisfactory and reproducible.

Caverno - Cavernostomy



Mitchell Technique



Secondary Goals of Epispadias Repair

The main secondary goal of penile and urethral reconstruction in the extrophy epispadias reconstruction is to increase the bladder capacity. Surprisingly, the type of epispadias repair does not affect the bladder capacity. With increased outlet resistance (with urethra under the corpora) a more marked increase in the bladder capacity was anticipated. However, it is too early to document this. Probably more experience with Mitchell repair might stimulate better bladder growth.

Modern techniques of epispadias repair will continue to improve the eventual outcome of the patients born with extrophy - epispadias complex.

References

1. Woodhouse CRJ, Ransley PG: The patient with extrophy in adult life. Br. J Urol, 1983; 55:632-635
2. Kelley JH: A procedure for lengthening phallus in boys with extrophy of the bladder. J. Ped. Surg. 1971; 6: 645
3. Cantwell FV: Operative treatment of epispadias by transplantation of the urethra, Ann. Surg.1985; 22:689
4. Ransley PG: Bladder extrophy closure and epispadias repair. Ped. Surg. 4th Ed 1988; 620-632
5. Mitchell ME, Bagli: Complete penile disassembly for epispadias repair. The Mitchell's Technique. J. Urol. 1996; 153-300

Endoscopic Surgery in Gynaecology

Today, endoscopic surgery has revolutionized the practice of gynaecology. It has modified the thinking approach, diagnostic ability and operative capability of gynaecologists. Teaching and learning of surgery has become very easy and unlike open surgery the whole team in the operation theater can participate in the surgery. There are now few surgeries, which cannot be done endoscopically.

INFERTILITY SURGERY

Endometriosis

This is one of the commonest indication for therapeutic endoscopic surgery in infertility. Endometriosis is present in 15-20% of laparoscopies performed for infertility. The diagnosis of endometriosis is by vision, either by laparoscopy or during laparotomy. Early endometriosis lesions appear as red, white or black lesions in the pelvis. The early lesions are excised or coagulated with bipolar diathermy at laparoscopy. In severe endometriosis the ovaries became adherent to the tubes, uterus or pelvic side wall. The ovaries may contain endometriotic cysts of varying size. The rectum can also become adherent to uterus and Pouch of Douglas. The aim of conservative surgery is to restore the anatomy of pelvis and to destroy the endometrial implants. Endometriotic cysts may be treated by enucleation or coagulation of the cyst lining, depending on whether the cyst is intraovarian or extraovarian. There is very little role for medical therapy with Danazol or GnRH for patients with infertility.

Our experience in treating 532 patients of endometriosis showed a pregnancy rate of 38% for mild endometriosis, 56% for moderate endometriosis and 56% for severe endometriosis (Paul, 1999).

Tubal disease

Tubal factor is responsible for 20% of women with infertility. The common predisposing factors are pelvic inflammatory disease, previous pelvic surgery, endometriosis, pelvic tuberculosis and appendicitis. The common presentations are tubo-ovarian adhesions, proximal tubal block, distal tubal block and hydrosalpinx. Adhesions are treated by adhesiolysis laparoscopically. Proximal tubal block is now treated by hysteroscopic cannulation. Hydrosalpinx can be managed by salpingoneostomy. Major degree tubal damage is now better treated by IVF than surgery.

Reversal of sterilization is still the preferred treatment over IVF, because of the superiority of pregnancy outcome. Traditionally it is performed by open micro surgical technique. Now with the availability of very high-resolution endoscopic cameras it is possible to do the anastamosis at laproscopy with 7/0 or 8/0 sutures. We performed laparoscopic tubal anastomosis for the first time in India. The results are still inferior to the open micro surgical technique.

DR. PAUL PG
Director, Cochin Gynaecological Endoscopic Training Centre
36/1919 A, Sebastian Road, Kaloor, Kochi - 682 017

Myomas

Myoma is one of the commonest benign tumors of the uterus. 25% of women over the age of 35 have myomas (Buttram, 1981). Majority of myomas are asymptomatic. The role of myoma in producing infertility and habitual abortion is not proven. However 40-60% of women complaining of infertility become pregnant after myomectomy, even if no other causes of infertility can be identified (Verakauf, 1992). Laparoscopic myomectomy is performed for subserous and intramural myomas. Meticulous endoscopic suturing and tissue removal are two difficult steps in laparoscopic surgery. Excessively large myomas, myomas very close to fallopian tubes or uterine vessels are difficult by laparoscopic route (Parker, 1994). Submucous myomas are ideally treated by hysteroscopic surgery.

We had published our results of 222 laparoscopic myomectomies performed from 93-97. Indications were infertility in 60% cases. Majority of patients had single myoma (64%). 28% of primary infertility and 33% of secondary infertility patients conceived after myomectomy (Paul, 1999).

GYNAECOLOGICAL SURGERY

Tubal Pregnancy

Incidence of ectopic pregnancy has risen sharply in recent years. (Victor Gomel, 1995). The recent increase in ectopic pregnancy has been attributed to increased incidence of sexually transmitted diseases, widespread practice of family planning methods and more successful clinical detection of ectopic pregnancy. Early diagnosis of ectopic pregnancy is now possible with sensitive pregnancy test and transvaginal ultrasound. Very early ectopic pregnancies are now managed by medical treatment. But majority require surgical treatment. Laparoscopic salpingectomy is done when infertility is not a concern.. Preserving the tube by salpingostomy is the preferred method for fertility preservation.

We performed laparoscopic surgery for 139 patients during 1993-98. Lap. salpingostomy was done in 89 and salpingectomy in 50 patients. 46% of patients trying for pregnancy had a live birth after surgery and 23% of patients had repeated ectopic pregnancy. Those who had 2 ectopics; 50% of them had a third ectopic pregnancy.

Ovarian Cysts

Most ovarian cysts in the pre-menopausal women are benign. So in selected patients, management of ovarian cysts via operative laparoscopy is appropriate. The main objection to laparoscopic management of ovarian cyst is fear of spillage of cancer cells into peritoneal cavity if the tumor turns out to be malignant. Various studies have reported that the rate of relapse and progress of ovarian cancer was not influenced by intraoperative spillage of tumor (Dembo, 1990; Maimon ,1991).

Preoperative evaluation with sonography, colour doppler and tumor markers helps to evaluate the malignant potential of the tumor. Ovarian cystectomy or oophorectomy is the treatment depending on the type of cyst, age and fertility of the patient.

We treated 206 ovarian masses laparoscopically - 54 teratomas, 67 serous tumors, 27 mucinous cysts, 36 paraovarian cysts and 22 miscellaneous types. Majority was treated by ovarian cystectomy and the rest by adnexectomy. We encountered 4 border line malignancies in this series.

Bursch's Colposuspension

Urinary incontinence is a common complaint in parous and old women. Stress incontinence accounts for about 50% of all cases of incontinence. Several types of surgeries have been described for correction of stress incontinence. Tanagho's modification of Bursch's procedure is reported to have the best outcome in patients with hyper mobile type of stress incontinence. Technique is same as followed in open Burch's procedure.

Retzius space is dissected and Cooper's ligament identified on both sides. The paravaginal tissue at the level of urethra vesical junction is cleaned of fibro-fatty tissue. One or two sutures are taken from Cooper's ligament to the dissected paravaginal tissue on both sides. This elevation of the urethro-vesical junction helps to correct the incontinence.

Hysterectomy

Hysterectomy is one of the commonest major gynaecological surgical procedures performed. About 75% of hysterectomies are performed abdominally in most centres. These hysterectomies can now be performed laparoscopically. Various terminologies are used for laparoscopic hysterectomy depending on the number of steps performed laparoscopically and vaginally. When the lower pedicles are handled vaginally, it is called laparoscopically assisted vaginal hysterectomy (LAVH). When hysterectomy is completed at laparoscopy it is called total laparoscopic hysterectomy. If lymphadenectomy is also performed along with hysterectomy, it is called radical laparoscopic hysterectomy.

Different energy modalities can be used for handling the vascular pedicles during hysterectomy. Electrosurgery is the commonly used modality. Ligation with intra or extra-corporeal knotting techniques can also be used. Endo-GIA staples are costly and risky at the level of uterine vessels. Harmonic scalpel can coagulate and cut the vascular pedicles simultaneously.

We had performed more than 400 hysterectomies using diathermy and harmonic scalpel. 2 procedures had to be converted to open hysterectomy because of dense adhesions and large size of uterus.

HYSTEROSCOPIC SURGERIES

Gynaecologist borrowed the cystoscope and resectoscope from urologist for doing hysteroscopy. The urologic resectoscope was first used in hysteroscopic surgery in 1974 to resect a submucous myoma (Newirth, 1976). Now it has become the standard treatment for submucous myoma. Gynaecologist prefers to use a continuous flow, passive handle resectoscope for hysteroscopic surgery. The out flow holes on the sheath of the resectoscope is made bigger, as it gets clogged with endometrial debris. We use positive pressure to distend uterus, as uterine wall is thicker and the capacity is only 5-20 ml.

Uterine septum causing repeated pregnancy loss is traditionally treated by laparotomy and metroplasty. Now it can be elegantly treated by hysteroscope. When menorrhagia does not respond to medical treatment, endometrial lining can be resected like prostate with resectoscope. Many hysterectomies can be avoided by this technique of endometrial ablation.

COMPLICATIONS

Laparoscopic surgeries like any other surgical procedures are not devoid of complications. However complications can be reduced if proper precautions are taken.

An average complication rate during laparoscopy is 1-3 %. A multicentric study of 17,521 laparoscopic procedures had an overall complication rate of 3.2/1000. 57 laparotomies were performed for hemorrhage and visceral complications. There was a death reported in this series.

Our series includes 10,000 sterilisations and more than 5,000 laparoscopic operative procedures. There were 9 bowel injuries, 3 bladder injuries and one ureteric injury in this series. Bladder injuries were repaired laparoscopically. There was one mortality in our hysteroscopy series due to air embolism.

SUMMARY

Almost all gynaecological surgeries can be performed endoscopically. Most of the procedures are well established and standardized. A few surgeries like laparoscopic lymphadenectomy are in experimental stage.

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Fluid and Dietary Management in Stone Patients

A very important aspect in the management of urinary stone disease is the advice regarding dietary and fluid management. This aims at correcting the root cause of calculogenesis and reduces the incidences of stone recurrence. A detailed dietary history is very important to give a meaningful advice. The patients are often confused with the various opinions given by well meaning friends and relatives. In this scenario the treating urologist has a very important role to play. For this he has to be well versed with the calculogenic potential of the various food stuffs and the possible impact in a given patient based on a detailed metabolic work up. The patient has to be told about the food substances that he has to avoid. It is equally important to reassure him about the things that he can take. This article attempts to give some guide lines to help in giving a proper dietary advice.

FLUID MANAGEMENT

It has been shown that people with urinary stone disease consume lesser quantities of fluids resulting in the saturation and precipitation of the various constituents. Increasing the daily fluid consumption produces water diuresis and dilutes the components that may crystalize. It also reduces the average time of residence of the free crystal particles in the urinary system. Both these will offset the theoretical risk of increased urine output, which will lead to dilution of the urinary inhibitors and increase in the ionic activity coefficients. It will be surprising to note that many of the patients consume less than the normal requirement of fluids daily. It is important to increase the urinary output to greater than 3 liters per day. The patients can measure their 24-hour urinary output once a week to monitor their compliance. It is important to maintain the increased fluid intake and not to stop it after some time. Stone growth does not occur throughout the entire day, but rather during certain periods of time when the urine becomes super saturated -overnight, after a meal and during times of increased fluid loss. The maximum fluid intake should occur within 3 hours before meals, during periods of strenuous physical activity, at bedtime and once in the middle of night. The occupation of the patient also should be considered as one with an indoor occupation does not require that much fluids as one who has to work in a hot environment. A significant portion of the daily fluids has to be in the form of plain water. A large group of patients have to be taught about the need to take plain water. It has not been proved that the consumption of hard or soft water makes a difference in the calculogenic potential. Jeera water, that is very popular, may not be suitable in large quantities as it contains large amounts of calcium and oxalate. Barley water, kanji water and thin buttermilk are all good alternatives.

Bottled drinks other than soda are not ideal as they contain oxalates. Beer that is often advocated for stone disease produces diuresis and flushes out small stones. However it has to be kept in mind that beer contains large amount of oxalates. Caffeinated beverages like tea, coffee and chocolates should be consumed in moderation and in a dilute form. Though a restriction on milk and milk products is not required, over indulgence should be curtailed. Fresh fruit juices in general are not harmful. It has been shown in a recent study that lemonade, orange juice and apple juice have shown to increase the incidence of calculi. It has to be kept in mind that only megadoses of Vitamin C will be converted to oxalate in the body.

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DIETARY MANAGEMENT

The dietary advice should include the food stuffs that can be taken and should also take into consideration the background of the patient. A detailed history is an important prerequisite as it is often possible to identify some dietary irregularities in most of the patients. It may not be feasible for a patient to totally avoid some materials as he may be regularly forced to eat outside. The common advice to a nonvegetarian to become a vegetarian will not totally prevent stone recurrences. It is interesting to note that expatriates working in Gulf countries have a higher incidence of calculi. This could partly be due to their changed dietary habits with a higher consumption of bottled drinks, chocolates, nuts and animal proteins.

The incidence of urinary stones is higher in a population with a high protein intake. Proteins increase the urinary calcium, oxalate and uric acid levels along with a reduction in urinary citrate excretion. However it has been found in studies that protein intake was not consistently higher in patients with stones. Hence excessive protein restriction is not advocated. Animal proteins of the red and white variety have to be restricted. This will help in reducing the incidence of coronary heart disease also. Excessive intake of dietary purines will also cause hyperuricosuria. The patients with uric acid lithiasis should avoid organ meats, meat extracts, soup, coffee, tea, chocolates and alcoholic beverages.

There is a close relationship between dietary fat and urinary solutes. Calcium binds with the oxalates in the diet to form insoluble salts, which are excreted in the feces. Free fatty acids will combine with calcium also to form insoluble soaps. When more fat is available in the diet, it complexes with calcium which is not available to combine with oxalate. This increases the free oxalate in the gut, which gets absorbed. Hence the quantity of fat consumed also should be curtailed. A high carbohydrate intake has a hypercalciuric effect probably caused by the impaired tubular reabsorption secondary to the insulin surge after the ingestion of a high carbohydrate diet. Dietary fibres decrease the calculogenic potential in hypercalciuric patients through the binding of intestinal calcium to phytic acid. The increased alkali provided by the vegetable fibre augments citrate excretion also. It should be kept in mind most the fibers are rich in oxalates also.

It is a general advice to reduce dietary calcium. This will reduce hypercalciuria and recurrent stones. However it has to kept in mind that urinary calcium will be reduced only in patients with absorptive hypercalciuria. Moreover severe calcium restriction is inappropriate, as it will lead to the availability of more free oxalates for absorption. A higher risk of severe calcium restriction is that it will lead to negative calcium balance with marked bone resorption and osteoporosis.

A high sodium intake will produce hypercalciuria, hypocitraturia, increased urinary pH and increased calcium phosphate and monosodium urate. Hence the use of salt in the diet has to be reduced. There is epidemiologic evidence to show that increased potassium is associated with a higher risk of stone recurrences.

It is prudent to cut down excess intake of red meat, shrimps, crabs, shell fishes and alcoholic beverages. A limited consumption of fish, chicken, milk and eggs is allowed. While it may be good to limit cheese, butter and ghee, smaller amounts of these in the diet need not be fully avoided. Daily consumption of cashew nut, almonds and other nuts is not good. However, it has to be kept in mind that a small amount in preparation need not worry the patient. In general all the common cereals and pulses are not harmful. The various roots and tubers available need not be avoided.

Most of the green leafy vegetables contain a high quantity of calcium. Spinach has one of the highest amounts of oxalate content. Cabbage is often implicated in stone formation. However cabbage and cauliflower do not

have any substances with lithogenic potential. One of the most maligned food materials is the humble tomato. It is uniformly avoided by stone patients. There is no convincing evidence to show that tomatoes increase the incidence of stone formation. All the commonly available fruits can be consumed. Gooseberries contain excess vitamin C, which is converted to oxalate. Tinned fruits, fruit juices and jams have to be checked for their content as some fruits like cranberries and raspberries are not good. Coconut water, a popular drink, is not harmful.

There is nothing to choose between the various oils available for cooking. Butter and ghee in limited amounts are not harmful. It has to be kept in mind that excess fat will increase the free oxalate available in the gut for absorption. Peanut butter is better avoided. Onions and chillies of all varieties are safe. Condiments and spices need not be avoided. Excessively salted food preparations and pickles should be avoided.

The dietary management need not look very horrendous for the patient. He has to look positively at the food substances that he can take and not to worry about those he has to restrict or avoid. As one patient put it very philosophically "dietary restriction is better than recurrent stones with its symptomatic and financial implications". This aspect has to be fully explained to the patient so that he can have a stone free life. The following generalisations could be made.

1. Fluid therapy should be the front line approach
2. Animal proteins and sodium should be restricted.
3. Indiscriminate calcium restriction should be avoided
4. Oxalate should be restricted for oxalate stone formers

Retroperitoneoscopy

The practice of urologic surgery is inherently of a retroperitoneal and extraperitoneal nature. It is here that the organ of interest to the urologist reside. Retroperitoneal laparoscopic surgery is the procedure of choice for endoscopic exploration of all retroperitoneal organs. Because most of the endoscopic surgeons met with their 'Waterloo' in this field, retroperitoneoscopy could not become popular in the past. Failure of creation of a satisfactory pneumoperitoneum because of the dogged resistance offered by the retroperitoneal tissue, during their repeated endoscopic endeavours, made them recede from retroperitoneoscopy.

Though the retropertioneal laparoscopy was started in the year 1979 by Wickham, who performed a ureterolithotomy using pnemoinsufflation and a standard laparoscope, retroperitoneoscopy as it is today, was developed by the pioneering work of Dr. Durga Gaur. He described the balloon technique of retroperitoneoscopy in the year 1992. Balloon dilatation of retroperitoneum enabled the urologist to rapidly dissect the fibrofatty tissue of the retroperitoneum, thereby creating a working space adequate for laparoscopic surgery. From this seminal work, the entire realm of retroperitoneoscopy has grown

INSTRUMENTS FOR RETROPERITONEOSCOPY

Instruments are the same as that for transperitoneal laparoscopy. Special instruments required are

1. Balloon dissector: Balloon originally used by Dr. Gaur, is the middle finger of a glove tied over the end of a red rubber catheter and it can be inflated to the desired level (even upto 2000 ml) without much rise in pressure. Commercially available balloons designed for the procedure can also be used.
2. Pneumoinsufflation equipment: Commercially available pneumoinsufflator with pressure and flow control can be used for performing retroperitoneoscopy. Air insufflator capable of delivering a flow of more than 5 litres of gas per minute should be used. Carbon dioxide is the most commonly used gas for pneumoinsufflation. Nitrous oxide can also be used.
3. The video camera system: The newer three dimensional cameras have advantages over traditional two dimensional cameras, but the former is expensive.
4. Laparoscope: Both zero degree and thirty degree laparoscope should be available as the latter is useful for visualising area beyond a hump especially during dissection of the lower ureter through a lumbar approach.
5. Balloon inflation equipment: Though the balloon is usually inflated using sphygmomanometer bulb or a 50 ml syringe, the carbondioxide hydromet can be used to perform a safe, effortless, expeditious and controlled inflation of the balloon.
6. Access equipments:

a. Veress needle: The needle used for routine laparoscopy is not essential for retroperitoneoscopy, but it should be kept ready for occasional release of tension pneumoperitoneum.
b. Hasson type trocar: Useful for converting the mini open access into a leak-proof port, but port can also be made airtight with sutures.
c. Secondary trocar: This equipment used for retroperitoneoscopy should be trim, short, and blunt, due to retroperitoneal space being small.

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7. **Other instruments required**:

Dissector: 5 & 10 mm spatula dissector for blunt dissection of retroperitoneal space.
Endoscissors
Electrocautery and laser unit
Endoknife (Gaur retractable endoknife)
Laparoscope needle holder
Suction equipment
Marcellators

CONTRAINDICATIONS FOR RETROPERITONEOSCOPY

The Urologist must know the contraindications for Retroperitoneoscopy before doing it.

1. Severe cardiopulmonary disease
2. Gross obesity
3. Intensive retroperitoneal fibrosis
4. Large solid retroperitoneal mass
5. Major vascular aneurysm
6. Bleeding disorders

PHYSIOLOGICAL CHANGES DURING RETROPERITONEOSCOPY

Carbondioxide used for pneumoinsufflation can get absorbed into the systemic circulation producing hypercarbia, acidosis leading to pulmonary hypertension and peripheral vasodilatation. This is rare in patients with normal pulmonary function. Hypercarbia, acidosis and cardiac dysrrhythmias are found in prolonged laparoscopic procedures especially in patients with COPD. Balloon inflated in the retroperitoneum can cause mild tachycardia due to sympathetic stimulation and on the right side, it can produce hypotension due to IVC compression. Pneumopericardium and pneumomediastinum are other rare problems during the procedure.

CHOICE OF ANAESTHESIA

General anaesthesia with cuffed endotracheal intubation and use of muscle relaxants is mandatory. This provides the anaesthesiologist with full control of pulmonary ventilation to guard against the ill effects of hypercarbia due to the absorption of insufflated carbondioxide. Pulse oximetry should be used to monitor circulatory and respiratory function. A fall in oxygen saturation should alert the anaesthesiologist as it could be due to hypotension, pneumothorax or gas embolism.

PROCEDURE

The success of retroperitoneoscopy depends upon careful, planned, meticulous execution of the following three main steps.

1. Achievement of initial access to the retroperitoneal space by the open or the closed techniques.
2. Expansion and dissection of the retroperitoneal space by inflating the balloon.
3. Establishment of the primary and secondary ports.

Retroperitoneal structures can be exposed by inflating the balloon in the retroperitoneal space using lumbar, iliac or suprapubic approach depending upon the requirement. These three approaches are combined for an extensive exposure of the retroperitoneal space.

Mini - open technique is the most commonly used procedure for gaining access to the retroperitoneal space. Being an open procedure it is relatively safe, as it obviates the need for blind Veress needle and primary trocar puncture. It provides an opportunity for placing the balloon in a proper plane for a satisfactory retroperitoneal dissection and for digital exploration of retroperitoneal space. Digital exploration is essential for safely placing the secondary ports by digital guidance technique.

Mini Open Technique

A 2 cm transverse incision is made in the subcostal region centered in the midaxillary line. Incision is deepened and the retroperitoneum is entered. Index finger is introduced into the retroperitoneal space, which is then gently dissected by stripping the parietal peritoneum and the transversalis fascia from the abdominal wall. After the subfacial plane has been dissected, a glove or a finger balloon mounted on a catheter is manipulated into the space. It can be advanced in a cranial or caudal direction depending upon the area of surgical interest. Balloon is inflated in the retroperitoneal space with 500 or 1000 ml of saline, till it become bimanually palpable in the lumbar region. Balloon is deflated and removed. A preliminary retroperitoneoscopy is performed through the primary port to inspect the space. One to three secondary ports are required for the various operative procedures. Sometimes a fourth port may be required for a complicated case.

Secondary ports are made either by visual guidance technique or by finger guidance technique. Laparoscope is fixed airtight in the primary port; Pneumoperitoneum is created and secondary ports are made under visual guidance. By passing the index finger through the primary port, secondary ports can be created under digital guidance also. The latter is safe, simple and expeditious. Secondary ports are usually made in the line of conventional subcostal incision, so that in the event of failure open procedure can be done by subcostal incision made by connecting the secondary ports.

Retroperitoneal dissection is done by using instruments passed through the secondary ports. After the desired procedure, a drain is inserted into the space and is taken out through one of the secondary ports. Removal of drain, period of hospitalization etc. is decided depending upon the procedure that has been done.

COMPLICATIONS OF RETROPERITONEOSCOPY

1. Usual Complications

a. Peritoneal tear
b. Surgical emphysema
c. Primary haemorrhage
d. Secondary haemorrhage
e. Paralytic ileus
f. Renal injury
g. Colonic injury

2. Cardiopulmonary Complications

a. Gas embolism
b. Hypertension either due to hypercarbia or due to retroperitoneal balloon dissection compressing the sympathetic chain.
c. Hypotension due to accidental gas embolism, pneumothorax or inferior venacaval compression.
d. Cardiac dysrrhythmias due to hypercarbia or due to mere pneumoinsufflation.
e. Pneumothorax due to inadvertent placement of trocar above 12th rib.
f. Pneumomediastinum

3. Hypercarbia

The incidence of hypercarbia is more in retroperitoneoscopy than transperitoneal laparoscopy due to extensive opening up of tissue plane. If pulmonary ventilation is not proper, significant acidosis can occur.

4. Abdominal Complications

a. Peritoneal tear: Inadvertent peritoneal tear can lead to pneumoperitoneum and subsequent cardiopulmonary dysfunction

b. Surgical emphysema

c. Vascular injury to renal vein, adrenal vein and lumbar vein

d. Visceral injury

APPLICATIONS OF RETROPERITONEOSCOPY IN UROLOGY

1. Ureteral Surgery

Ureterolithotomy, Ureterolysis, ureteroureterostomy, ureteral reimplantation etc.

2. Decortication of Simple Renal Cysts

Retroperitoneoscopic decortication has become more acceptable method of treatment than any other metho described.

3. Nephropexy

Nephropexy for symptomatic nephroptosis has revisited with the advent of minimally invasive procedure lik retroperitoneoscopy.

4. Nephrectomy

Retroperitoneoscopic nephrectomy is done for

Small, benign, non functioning, symptomatic kidneys

Pre-transplant native nephrectomy for ESRD patients

Small malignant renal tumours

Live donor nephrectomy

5. Pyelolithotomy

6. Pyeloplasty

7. Varicocelectomy

Retroperitoneal laparoscopic varicocelectomy can be done only for patients requiring unilateral varicocele tomy. Transperitoneal approach is required for bilateral problem. This procedure is only a stepping stone f the urologist to start practising retroperitoneoscopy. Open surgical procedure being simple and efficient, st remains the gold standard treatment for varicocele.

8. Adrenalectomy

Retroperitoneal laparoscopic adrenalectomy is superior to the transperitoneal laparoscopic approach or the open surgical procedure, for benign diseases of the adrenals.

9. Pelvic Lymphadenectomy

Pelvic lymph node dissection is mostly considered as a staging procedure for malignancies of the bladd prostate, urethra and penis. Laparoscopic procedure is superior to the open procedure.

10. Colposuspension:

Laparoscopic colposuspension is done for stress urinary incontinence. It is a versatile minimally invasive procedure with better results than open bladder neck suspension. Suturing and suspension is done as for Bursch procedure in the space created by balloon dissection.

11. Orchiopexy/Orchiectomy

These procedures for undescended testes can be done better with laparoscopy than by open procedures. Laparoscopy is the investigation of choice for localising the undescended testis.

12. Drainage of Psoas Abscess

Retroperitoneal laparoscopic drainage of psoas abcess is a minimally invasive procedure and is best indicated for a deep seated abscess.

It is seen that laparoscopy has wider applications in urology than in any other branch of medicine and I am sure, in the days to come, the urologist cannot escape practising urology without laparoscopy.

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Surgical Complications in Live Renal Transplants - My Personal Observations

We have done about 207 cases of live donor renal transplantations out of which 185 have been done at Madurai Kidney Centre and Transplantation Research Institute and 22 cases in Madurai Medical College and Govt. Rajaji Hospital, Madurai over a period of last 12 years.

I intend to discuss the surgical complications encountered by us in these 207 cases in the following context.

In donor surgery, assessing the individual function of the kidney-whether isotope study is a must?

Selection of the side of the donor nephrectomy - when both kidneys have some findings which post problems during vascular or ureteral anastomosis (like one side very early division and other side apical branch from the proximal part of the main stem, bilateral duplicated system etc).

Tackling the venous anomalies (especially lumbar, gonadal, renal vein conglomeration) is a difficult step of donor nephrectomy.

In my opinion, going through the 10^{th} rib has definite advantages, provided one learns to tackle the pleura well.

Spasm of the renal artery was a big problem in our early cases and we prefer to start mannitol in the early stage of donor nephrectomy.

In recipient surgery, I intend to discuss the following problems:

Prolonged drainage from extraperitoneal site, dilemma of intervening for lymphocele and management of lymphocele.

Ureteric necrosis and urine leak is totally avoided by a modified technique of ureteroneocystostomy.
We have prevented gaping of wound due to immunosuppression which occurred almost once in 4 cases earlier.
A rare case of calyceal fistula was faced by us and its long term follow up is worth nothing.

We also had problems in evaluating patients with preexisting urological complications like neurogenic bladders, posterior urethral valve fulgurated in childhood and recipients with borderline BHP (we have done TURP/TUIP for them) and a case of recto urethral fistula and CRF (for whom closure of fistula and then transplant was done).

Vascular problems are the dreaded one in long standing diabetes and patients over 50 years.

We have also done a few second transplants for rejection of the first transplant. We have done inguinal hernia repair and incisional hernia repair along with the recipient surgery.

I would try to highlight my observations while solving the above problems.

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Dialysis Therapy

The word "dialysis" originates from a Greek word, which means "to remove from". Various nitrogenous waste products accumulate in patients with renal failure; dialysis removes these metabolic wastes from the patient's blood.

The two forms of dialysis available today are:

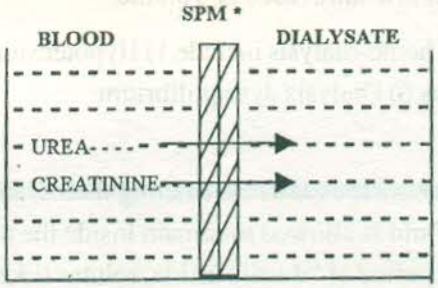
1) Hemo-dialysis and 2) Peritoneal dialysis

Hemo-dialysis

Sir Wilhelm Kolph performed the first successful hemo-dialysis in man in 1946. Subsequently, the technique has undergone a lot of modifications and technological advancements. Today the majority of patients with end stage renal disease are treated with hemo-dialysis (as the mode of renal replacement therapy).

The process of hemo-dialysis works on two physical principles:

1. **Diffusion**: Is a physical process in which solutes move from an area of higher concentration to an area of lower concentration; this movement is between the blood compartment and the dialysate (dialysis fluid).



*** semipermeable membrane**

Diffusion – the movement of solutes based on concentration gradient

2. **Ultrafiltration**: Is a process in which water moves from one compartment to the other across a semipermeable membrane, based on the hydrostatic pressure.

Vascular Access: Patients undergoing hemo-dialysis need a good vascular access to ensure an effective blood flow (200-300 ml/minute) to the dialyzer. The access could be either a) temporary (femoral/subclavian/jugular catheterisation) or b) permanent (arteriovenous fistula or arteriovenous graft).

Equipment & Disposables Required: An artificial kidney (hollow fibre dialyzer), blood tubings to carry blood to and from the dialyser and a dialysis machine to monitor the process of dialysis are essential in a dialysis unit. The hollow fibre dialyser is made up of several hollow fibres; patient's blood flows inside these fibres and the dialysis fluid (dialysate) flows outside. Thus the blood and the dialysate are separated by the walls of these hollow fibres, which forms the semipermeable membrane; transfer of solutes and water occur across this membrane.

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The hollow fibres are composed of cellulose, modified cellulose or synthetic polymers.

Indications: Hemo-dialysis is used as a treatment modality in patients with renal failure (acute and chronic) and for removal of certain poisons or drugs which are dialysable. Low molecular weight, water soluble drugs which are poorly bound to proteins are usually dialysable. The usual indications or dialysis in renal failure are:

Serum creatinine above 8 mg/dl

Uremic encephalopathy

G.I. symptoms due to uremia

Uremic pericarditis

Fluid overload/pulmonary oedema

Metabolic acidosis or hyperkalemia, not responding to medical therapy

Uremic peripheral neuropathy

Contraindications for Hemo-dialysis: Hemo-dialysis cannot be done in patients with hemodynamic instability; systolic blood pressure should be at least 100 mm Hg if a patient has to be taken up for hemo-dialysis. Patients with acute myocardial infarction may not tolerate HD for about 48 hours following the infarction. Small children would not tolerate HD, as they have a low intravascular volume.

Complications: The complications of hemo-dialysis include 1) Hypotension 2) Vomiting 3) Allergic reactions 4) Muscle cramps 5) Cardiac arrhythmias 6) Dialysis dysequilibrium

Peritoneal Dialysis

In peritoneal dialysis, patient's peritoneum is used as the filtering membrane. PD fluid is instilled into the peritoneal cavity through the catheter; the fluid is allowed to remain inside the cavity for a certain period of time and subsequently drained out. During the period of "dwell" inside, solutes (like creatinine) and water move from the blood within the peritoneal capillaries to the PD fluid in the cavity.

Types

Intermittent

Continuous - Ambulatory PD (CAPD)

Cyclical PD (CCPD)

Intermittent PD is used for hospitalised patients where dialysis is done for 24 to 48 hours. Hourly exchanged cycles are usually used.

CAPD: Is used in patients with end stage renal disease. Usually four exchanges (2 litres bag each time) are done in a day. The patient or his relative is trained to observe aseptic techniques and do the fluid exchanges four times a day.

The major advantages of CAPD over hemo-dialysis are: 1) The patient does not have to come to the hospital frequently. 2) No loss of working hours. 3) Being a continuous and slower mode of therapy, there is no hemodynamic instability. 4) Less restrictions on diet compared to a patient on hemodialysis. 5) Patient can go for his work without interruptions, and can travel as well.

The major drawback of CAPD is the cost of treatment.

CCPD: A machine (cycler) is used to perform the fluid exchanges at night while the patient sleeps.

Complications

Peritonitis is the major complication; the incidence can be reduced by proper aseptic techniques. Exit site and tunnel infections also occur. Hernia, hydrothorax, pericatheter leaks and hemoperitoneum are occasional complications.

Indications

Intermittent PD is indicated in

i) Patients with acute renal failure, who are not suitable candidates for HD (small children, adults with hemodynamic instability, recent acute myocardial infraction)

ii) Patients with chronic renal failure if facilities for HD are not available.

CAPD is suitable option for ESRD patients with diabetes and cardiac dysfunction.

Contraindication

A recent abdominal surgery is a contraindication for PD

Management Strategies in Upper Ureteric Calculi

The management of upper ureteric calculi has always been an area of controversy since the advent of the newer minimally invasive techniques for the removal of ureteric stones. These procedures have significantly reduced the morbidity and patient recovery time required for successful stone removal. However, the almost equal success rate of these new options has given a new dilemma to the physician as well as on the patient: which is the most appropriate modality to choose for a particular stone?

One of the early descriptions of ureteric calculi was by Ambrose Pare, who remarked in 1564. "Oft time it falleth out that the reines, using their expulsive faculty, force down the stone for themselves into the ureters: but it stayeth there either by reason of the straightnesse of the place or the debility of the expulsive faculty. Therefore the cruell pain tormenteth the patient in that place where the stone sticketh, which also by consent may be communicated to the hippe, bladder, testicles, and yard with a continuall desire to make water and goe to stoole".

Joachim Camerainum (1534-1598) may be credited with the first ureterolithotomy where the patient had actually forced the surgeon to operate on him because of the pain. But, for the next couple of centuries, management of ureteric stones was just confined to postmortem reports confirming ureteric obstruction. In 1851, Valpran first suggested that an upper ureteric stone may be removed by a lumbar approach based on postmortem studies. This was put into practice by 1880s by Bardenheur, Clement Lucas, James Israel etc. In 1885 Cullingworth tried a transperitoneal approach, but the patient died on the third day due to peritonitis. In 1889, Von Bergmann removed a stone from the upper ureter with a forceps introduced through the nephrotomy wound.

By the 1890s, extraperitoneal approach for upper ureter had become common place and it remained the standard of care for almost a century. But for the last 2 decades the management or ureteral stones has changed dramatically with the development of endourological techniques and ESWL machines and there are so many options now to choose from. While it is difficult, if not impossible to determine the best treatment for each individual stone, certain factors must be considered each time a specific treatment option is selected. These include actual need for stone removal, ultimate success of the procedure, number of procedures required to make a patient stone free, the time required to reach a stone free state, the availability of specific modality in he community, the ultimate cost of the procedure, and finally the patient preferences [1].

Conservative Management of Upper Ureteral Stones

With the increasing success rate of minimally invasive procedures, the temptation always exists to intervene in all cases of stones. But it is a well established fact that majority of ureteral calculi pass without any intervention at all. In the absence of absolute indication for intervention like infection, severe obstruction, renal impairment and uncontrollable pain, a trial at conservative management is always worthwhile.

Factors which predict spontaneous passage of stones include stone size less than 6 mm duration of colic less than 30 days, pyuria less than 100 WBC/HPF, lack of irregular stone surface and partial obstruction[2].

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The size of the stone is the most important factor which decides the spontaneous passage. Hubner et al states that no stone greater 6 mm passes spontaneously. A stone 4-6 mm took about 2.8 weeks while stone less than 4 mm took 1.6 weeks. Miller et al[3] states that 95% stones 2-4 mm pass spontaneously while 4-6 mm stones pass only 50% of the time. In Uno's series, the passage rates for less than 4 mm, 4-6 mm and more than 6 mm were 80% 59% and 29% respectively. Miller et al have proposed a multiple linear regression model to predict days to stone passage.

Days to stone passage: 20.21 + 5.01 X size - 4.23 X position - 7.25 X side

(Position: Proximal = 1, Mid =, Distal = 3

Side: Left = 1, Right = 2)

The use of narcotic analgesics or nonsteroidal anti inflammatory drugs remains effective in treating an acute attack of ureteral colic. Ureteral pressures and RBF rise substantially in the first few hours of obstruction. By 24 hours, the pressures in the ureter are about half the peak value and RBF is about 70% of normal. So the pain is maximum in the first 24-36 hours. Avoiding overhydration during the acute period and the judicious use of analgesics often makes the spontaneous passage of stone less painful. Keterolac is found to be effective because of its narcotic like activity as well as prostaglandin inhibition[4]. Corticosteroids to reduce ureteral oedema and calcium channel blockers to relax the ureter have also been tried.

Other factors to be considered when advising conservative therapy are the degree of pain, narcotic requirements, work requirement, family commitments and personal preferences. The patients on conservative management are followed up with X-ray KUB and ultrasound or limited IVP every 1-2 weeks. If there is no progression by the end of one month or if complications ensue, definitive therapy may be advised. The drawbacks of conservative treatment are that, it is associated with pain, uncertainty, potential risks to renal function and occasionally loss of work.

Stents alone in the management of upper ureter stones are not usually advised but may be indicated in a septic patient, in severe obstruction, in solitary kidneys and in those waiting for definitive therapy. Stents cause passive dilatation of the ureter and may allow a larger stone to pass. But sometimes, stents may produce severe irritative bladder symptoms. Having the flank pain relieved at the expense of bladder symptoms may not present an attractive option to many patients. Medical management may be another option in patients especially with cystine or uric acid stones.

Extracorporeal Shock Wave Lithotripsy

The ESWL offers the least invasive from of therapy for upper ureteric stones. Initially it was thought that in situ ESWL for upper ureteric stones was less successful. Muller et al[5] reported a 62% fragmentation rate for ureteral calculi treated in situ compared to 97% for ureteral calculi that were manipulated back into the kidney before ESWL. They hypothesised that fragments forming on the surface of a ureteral calculus are unable to disperse and form a shell around the stone. This shell may absorb and reflect shockwave energy preventing further disintegration. Parr and associates[6] compared the fragmentation of artificial stones lying free in saline, inside latex tubes, impacted and impacted and stented. They found that stones lying free fragmented on all sides. When lying inside latex tubes, the fragmentation was superficial. The impacted stones fragmented only on their end faces which were in contact with saline and in stented cases, a fine channel of erosion developed along the side of the stent. Increasing the number of shocks beyond 700 shocks/mm did not improve fragmen-

tation. They concluded that a stone-fluid interface was required for fragmentation. Mueller et al had similar results with stones kept on Penrose drains.

These experimental data were amply supported by clinical series in which the success rate of push-bang was above 90% while in situ ESWL had only 70-80% success rate[7]. But with more experience, the drawback of this push-bang school came into force. Earlier, the original HM_3 machines were used. These machines produced more shock wave energy but the focal point was wider. This increased the patient discomfort and anaesthesia was required for the procedure. So to manipulate the stone by retrograde techniques was easy because patient was under anaesthesia. These also required waterbath for application of shocks. Moreover, the localisation of stones was poor and most of the early series concentrated on the initial success rate and not on the three month clearance rate. The success rate of pushing back stone was only 30%. Also the electrode decay of the spark-gap machines produced difficulty in focusing. Most of the drawbacks of the spark gap machine are overcome in the newer second and third generation lithotriptors. These machines have a tight focal point and so produce least patient discomfort. Short acting parenteral sedatives like alfontanil, midazolam etc and topical agents like EMLA cream allowed these procedures to be done without anaesthesia. Robert M[8] fragmented 32 upper stones using the EDAP LT_{02} lithotriptor. Patients were given dextropropoxyphene and paracetamol orally and ketoprofene rectally supplemented with intravenous alfentanil if required. He had a success rate of 90% and he concluded that ESWL in situ of upper ureter stones can be done even without intravenous alfentanil. Wear and tear of these machines is less and more energy could be focused on the stone. These machines have both ultrasound and fluoroscopy and stone localisation is better. To try to push the stone back into the pelvis requires additional anaesthesia and so push-bang is no longer advocated with advent of second and third generation lithotriptors. The success rate of fragmentation may be slightly less than the original HM_3 machines because of the tiny F_2 focal point of newer machines.

Stents were also advised initially to improve the fragmentation. But stents require about 2 week for passive dilatation of the ureter and there was not much improvement in fragmentation rates. A comparison of different options are given in Table1

Table-1

Study	In situ (%)	Push back (%)	Stent (%)
Riehle	85	93	-
Parr	62	97	74
Rossweiler	85	87	-
Danuser	96	94	100
Lingemann	87	99	-
Elgammy	94	-	-
Roucherwald	80	-	-
Robert M	90	-	-

Most of the recent series of in situ ESWL shows good results. Robert M[8] using the EDAP LTO_2 had 90% clearance. ElGammy and Fonda[9] using the lithostar machine could achieve 99% fragmentation and 94% clearance at 3 months.

One of the main drawbacks of ESWL is the number of sittings required and the auxillary procedures required. Rouchenwald using the MPL-9000X required 42% auxillary procedures and 1.7 sittings. Elgammy required 1.6 sittings. Bendhack using the Seimens multiline lithotriptor required 43% auxillary procedures. The ESWL is costlier than the retrograde approaches and these additional sitting and auxillary procedures adds further to the burden of the patient and this becomes more significant when stone size is more than 1 cm.

The other drawback of ESWL is that the immediate stone clearance is less, difficult to break cystine stones and tightly impacted calculi. There is about 18% chance of urinary tract infection while trying to fragment struvite stones. Also there may be renal hematoma development if kidney comes in the field while trying to fragment upper ureteric stones.

Ureteroscopic Lithotripsy

The upper ureteric stones were not initially considered to be amenable by ureteroscopy but with the availability of semi rigid scope of 6.1F and flexible scope of 7F, they are also easily amenable to the endoscopist. The complications of ureteroscopy for proximal stones have also remarkably decreased over the years. (Table - 2).

Table-2

Significant complications of ureteroscopy (%)

Complications	Blute & Segura[10] (1988)	Abdel-Razzak & Bagley[11] (1992)	Hermon & Segura[12] (1997)
Perforation	4.6	1.7	1.0
Stricture	1.6	0.7	0.5
Avulsion	0.6	1.0	-
Urosepsis	0.4	-	0.5
Urinoma	0.6	0.5	-
Overall	6.6	4.0	1.5

The semirigid, flexible and actively deflectable ureteroscopes are usually preferred for upper ureteric stones. Initially, mainly the electrohydraulic lithotriptor and pneumatic lithotriptor were used but the Holmium -YAG laser has almost replaced them now.

Holmium-YAG laser carries definite advantages over EHL[13]. EHL fragments stones by producing cavitation bubbles. Fragments may be more than 4 mm. There is about 14% chance of retrograde stone migration which may require ESWL later. In contrast, Ho-YAG actually resects the stone and fragments are always less than 2 mm. There is no proximal migration of fragments. To try to fragment stones to less than 2 mm by EHL actually causes more damage to ureter. Vision is better with Ho-YAG and bleeding is less. It can be used by other departments like general surgery, orthopaedics etc. The stone free rates also favours Ho-YAG laser (Table-3).

Table-3

% Stone Free		EHL	Ho-YAG
Overall	Immediate	56%	94%
	3 months	87%	97%
Less than 15 mm	Immediate	65%	97%
	3 months	94%	97%
More than 15 mm	Immediate	33%	87%
	3 months	67%	100 %

Ho-YAG laser produces ureteric injury only if it is directed at the ureteral mucosa but EHL may cause damage even otherwise.

Many urologists prefer EHL because it is more affordable but many studies have shown that laser lithotripsy is actually more cost-effective in the long run. One drawback of Ho-YAG laser is the long operating time required. Another disturbing factor is the reports that Ho-YAG may produce cyanide while resecting uric acid stones[14].

Most of the recent series show good success rate with EHL. The clearance rates varied from 84-93% and the auxillary procedure rate was around 5%. The results of Ho-YAG laser are more impressive (88-99% clearance rates). Tawfeik et al[15] had a 99% success rate and the procedures were mostly done on an outpatient basis. The 2000 micron laser fiber has added further to the flexibility. Ershed and Bagley quote a success rate of 97% for proximal stones with a low complication rate[16].

Pneumatic lithotripsy using the swiss lithoclast also carries good results. Using the miniscope and swiss lithoclast, Murthy et al[17] had a success rate equal to ESWL in situ. In addition, it is reliable, safe and simple to operate and cost of maintenance is almost nil.

These high success rates of ureteroscopy have made it an attractive option over ESWL. It gives a faster clearance of fragments and is effective against all types of stones. Auxillary procedures are less. But the disadvantages are that it is an invasive procedure requiring anesthesia and sometimes in patient care and carries some risk of complications.

Antegrade Nephrostoureterolithotomy

Percutaneous approach for stone removal was in practice even before ESWL, but with the newer less invasive procedures, its role has been relegated to the management of complex upper-ureter stones like impacted calculi, that have failed other modes of stone removal, hard stones and distal obstruction. It is a more invasive procedure and has a higher complication rate because a higher puncture may be required. Liong et al found 100% success with the procedure but a 43% complication rate. Kumer and Ahlawat[18] had a 97% success with 86 impacted stones and a complication rate of 20%.

Laparoscopic Ureterolithotomy

The first retroperitoneal laparoscopic ureterolithotomy was done by Wickham in 1979 and Raboy et al performed the first transperitoneal ureterolithotomy in 1992. Laparoscopic approaches are usually reserved for large, hard long standing impacted stones. Laser laparoscopic ureterolithotomy is a new and minimally invasive technique.

Current Status of Open Surgery

With the minimally invasive techniques and laparoscopic approaches, there are only very few indications for open surgery. In a major referral centre, there were only 7 cases of open ureterolithotomy out of 780 procedures for stone removal[19].

Upper Ureteric Stones in Children

The management in young children parallels that in adults. Minimally invasive surgical methods can be safely used in children[20]. Al-Busaidy has more than 90% success with in situ ESWL while Nazli reports 88% success. Ureteroscopic techniques are also safely applied to children[21]. Ureteroscopy is indicated with a stone burden more than 10 mm and failed ESWL. Ho-YAG laser has been used with a success rate of 84%[21]. The incidence of vesico-ureteric reflux is low after ureteroscopy contrary to previous belief.

Patient Preferences and Physician Trends

The high success rate of the minimally invasive procedures has brought patient preferences also to be considered in the decision making. In a decision analytical study, it was seen that patients always preferred ESWL even above long term medical management[22].

In the 1998 AUA Gallop Survey, Oleary[23] analysed the physician's attitude in upper ureteric stone management in the United States. 99% of practising urologists treated ureteric stones. For a proximal ureter stone less than 1 cm, 51% choose ESWL in situ while 36% advised ESWL with stent and 11% ureteroscopy. For a stone larger than 1 cm 72% preferred ESWL with stent while 21% was for ESWL in situ.

Summary

While advising a particular procedure, one should consider not only the stone free rates but also the number of procedures required, number of auxillary procedures and the long term complications. ESWL and ureteroscopy appears to be equally successful in the management of upper ureter stones.

The endoscopic procedures are more definitive is stone removal and most recent series have success in excess of 90%. They can be used to treat all types of stones and the number of sittings and auxillary procedures has also come down. They give a superior result when the stone size is more than 1 cm. They are more cost-effective as well. But they are invasive procedures requiring in-patient care and carry a low but definite risk of complications. But ESWL, eventhough may have a lower success rate is a procedure with low morbidity, does not require anaesthesia and in-patient care and is better preferred by the patient[24]. The drawbacks of ESWL are its uncertainty and time for clearance, higher re-treatment rates, lesser success with stones larger than 1 cm, failure to treat hard and cystine stones and the high capital costs. The success rates of the recent lithotriptors are also less than the original HM_3 lithotriptor.

Segura and Drelter[7] in 1997 has put forward standards, guidelines and options for the management of upper ureteric stones. Standards carry no flexibility while option has the maximum. As a guide line, all newly diagnosed stones with high chance of passage should be advised observation. ESWL is the first line of management for a stone less than 1 cm. ESWL, PCNL and ureteroscopy are options for management of stones larger than 1 cm.

The ultimate technique to manage the upper ureteric stone should render the patient stone free with anaesthesia free, low morbidity, low cost procedure in one sitting. Though we have not reached this stage, the turn of the new millennium seems to be the come back of the friendly endourologist. Inspite of that, ESWL appears to be the procedure of choice because of low morbidity and patient preferences with endoscopy reserved for failed ESWL, cystine stones, impacted stones and distal obstruction. Endoscopy may be preferred more and more for stones larger than one centimeter.

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Management of Testicular Germ Cell Tumors

Introduction

Germ Cell Tumours (GCT) are the most common solid tumour in men between the ages of 20 and 35 years. The incidence of GCT varies according to geographic area, highest in Scandinavia, Switzerland, Germany and New Zealand; intermediate in United States and Great Britain and the lowest in Africa and Asia. The risk of GCT is high in cryptorchids, as 5-20% is found to develop a tumour in testes.

Clinical Presentation

1. Painless testicular mass
2. Diffuse testicular pain
3. Hardness

Diagnosis

A radical inguinal orchidectomy, using an inguinal incision with early high ligation of the spermatic cord at the deep inguinal ring, minimises local tumour recurrence and aberrant lymphatic spread and is the only acceptable therapeutic and diagnostic procedure.

Histology

GCT is broadly classified into: A.Seminoma B. Non-Seminoma

The three classifications are summarized in Table 1

Dixon and Moore	**WHO**	**British Tumour Panel**
Seminoma	Seminoma	
	Typical (classical)	Seminoma
	Anaplastic	
Embryonal ca.	Embryonal ca.	Malign.Teratoma-undiff.
Teratoma	Teratoma	Malig. Teratoma-diff
	mature	
	immature.....	
	with malignant differentiation	
Choriocarcinoma	Choriocarcinoma	Malig.Terat.-Trophoblastic
Yolk sac tumour (EST)	Yolk sac tumour	Yolk sac tumour
Teratocarcinoma	Mixed GCT	Malig. Teratoma-intermediate
Teratoma + embryonal ca.		
± other elements		

DR. GANGADHARAN VP

Head, Division of Medical Oncology, Regional Cancer Centre, Thiruvananthapuram

Staging

A comprehensive evaluation is necessary to define the extent of disease to plan appropriate treatment. This includes

1. Pathological examination of the primary tumour
2. Physical examination
3. Radiology
4. Serum Markers

Tumour Imaging

1. CxR
2. CT scan abdomen and chest/MRI
3. Lymphangiogram - Outdated

Serum Tumour Markers

1. Alpha feto protein (AFP)

AFP production is restricted to embryonal cell carcinoma and endodermal sinus tumour. Serum half life is 5-7 days. Normal adult concentration is usually less than 15 ng/ml.

2. Beta HCG

Elevated in seminoma (15-25% cases & non-seminoma (choriocarcinoma).

3. LDH

Increased LDH is observed in 60% of non-seminomatous GCT with advanced disease and in 80% of patients with advanced seminoma. It is a reflection of tumour burden - growth rate, proliferation and death.

Staging Classification

Refer TNM staging

Risk Classification		:	**International Consensus**
	Seminoma		Non Seminoma
Good risk	any HCG		AFP< 1000 mg/ml
	any LDH		HCG < 5000 mIu/ml
	any primary site		LDH < 1.5 x upper limit of normal
	non pulm visceral mets absent		non pulm. visceral mets absent
			Gonadal/retroperitoneal Primary tumour
Intermed Risk	non pulm. visceral mets +		AFP 1000-10,000 ng/ml
	Present		HCG - 5000 - 50,000 mIu/ml
	any HCG		LDH:1.5-10 times upper limit of normal
	any LDH		
	any primary site		non pulm. visceral mets absent
			Gonadal/retroperit. primary site
Poor risk	-------		mediastinal primary site
			non pulmonary viscer. mets +
			AFP >10,000 ng/ml
			HCG > 50,000 mIu/ml
			LDH > 10% upper normal

Management

Seminoma: Clinical stage I

Radiation therapy remains the treatment of choice. Ipsilateral hemiscrotum does not require therapy unless gross tumor spillage has taken place. Contralateral testis is shielded. 2500-3000 CGY/15-20 trt. given. Relapse rate within the irradiated portal is negligible. Systemic relapse rate is 2-9%.

NSGCT: Clinical Stage I

Radiation therapy has no role. The three treatment options are

1 RPLND
2. Observation
3. Chemotherapy

RPLND

Bilateral infrahilar RPLND is the conventional approach. Surgical mortality is less than 1% 20-25% on surveillance protocol develop retroperitoneal relapse. Infield recurrence is rare after RPLND. Retrograde ejaculation and subsequent infertility are problems. Modified RPLND is practiced now to avoid this complication.

Observation

Indications

1. T1 tumour
2. No vascular/lymphatic invasion
3. Normal tumour markers/declining at half life.

Surveillance policy

1. Physical examination
2. CxR
3. HCG & AFP
   monthly X first year
   bimonthly X second year
   quarterly X third year -fifth year
   annual X from fifth year
4. Abdominal CT
3 monthly X first year
4 monthly X second year
6 monthly X from third year

Chemotherapy

An investigational approach is two courses of cisplatin based chemotherapy. Fewer than 5% relapsed and about 1% died of GCT.

IIa, IIb Seminoma

Radiation therapy is the treatment of choice. Relapse occurs in 5-10 %.

IIa, IIb NSGCT

1. RPLND was the standard approach
2. Surveillance - compliant patients with less than 6 involved nodes and none larger than 2 cm.
3. Chemotherapy - 2 cycles of cisplatin based treatment-especially if 6 or more nodes involved, node > 2 cm. extra nodal extension.

Stage II and III disease (high tumour burden)

Cisplatin based chemotherapy can cure 70-80% patients. But significant adverse effects were observed good and poor risk allocation algorithms were developed to modify the treatment.

Good risk GCT

Cure rate of 95%. Four cycles of EP (etoposide, cisplatin) or three cycles of BEP (bleomycin, etoposide, cisplatin) are therapeutically equivalent.

Poor risk GCT

Four cycles of BEP is the treatment of choice. 20-30% fail to achieve durable CR. High dose therapy is undergoing clinical trials.

Management of residual disease

In general exploration is indicated when serum markers are normal and residual radiological abnormalities persist. Raised serum markers following chemotherapy warrant salvage chemotherapy.

Management of relapse after chemotherapy

VIP (etoposide, ifosfomide, cisplatin) and VeIP (vinblastine, ifosfomide, cisplatin) offer a cure rate of 25% . Testicular GCT and a prior CR have a better prognosis. High dose chemo with autologous PBSCT is an alternative salvage option. Mediastinal GCT, refractoriness to initial and salvage chemo, refractoriness to cisplatin and those with serum HCG more than 1000 times normal are poor prognostic factors for high dose chemotherapy.

Toxicities

Nephrotoxicity
Neurotoxicity
Myelosuppression
Pulmonary toxicity
Vascular toxicity
Infertility
Second malignancy

Newer drugs

Paclitaxel
Ifosfamide
Oral etoposide

Conclusion

Treatment of testicular GCT is a story of success. Advances are aimed at reducing the toxicity and offering better salvage regimens.

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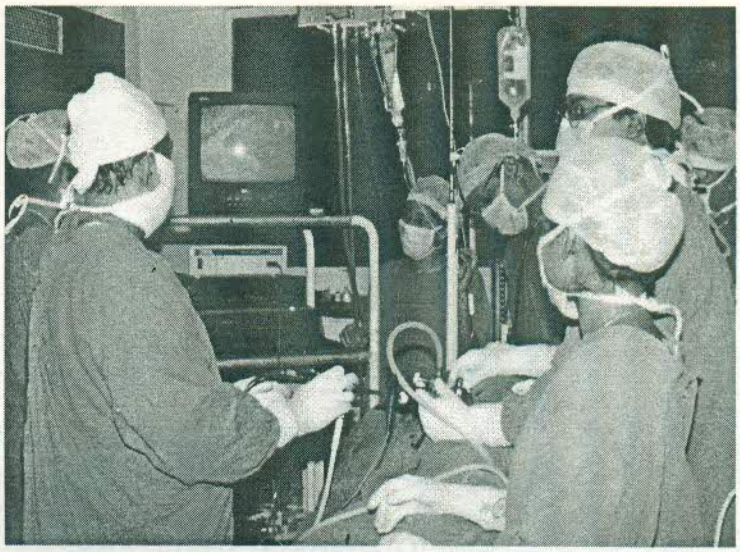

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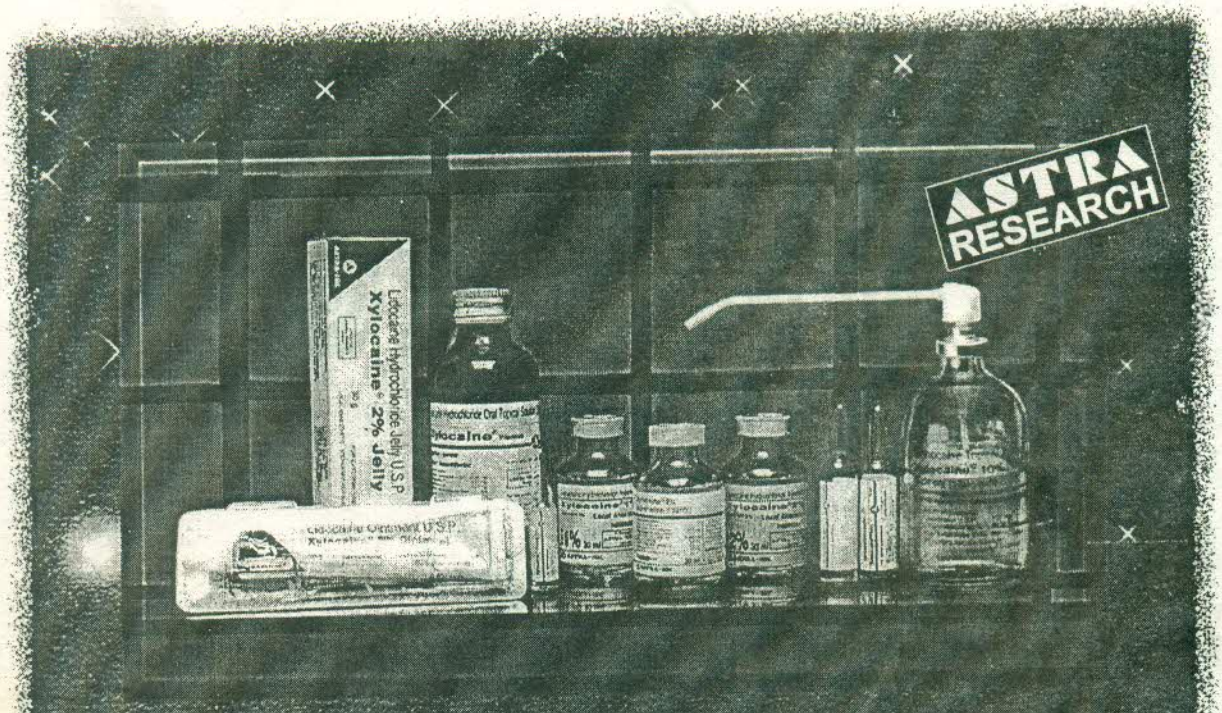

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