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Case Report

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Efficacy of Topical Local Anesthetics for Pain Relief in Acute Burn

VijayaraghavanNandhagopal*, Ravi Kumar Chittoria, Devi Prasad Mohapatra***, Friji Meethale Thiruvoth***, Dinesh Kumar Shivakumar***, Arjun Ashokan***

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Abstract

This is a preliminary result of an ongoing thesis work of Post Graduate Resident of Plastic Surgery in a tertiary care Institute. Aim of study was to evaluate the role of topical lignocaine solution in pain management of acute burn in first 24 hours. Eighteen patients were grouped into study and control group. Topical application of 2% lignocaine solution (5 mg/kg) with supplemental oral ketamine (3mg/kg) in the study group was compared with normal saline in the control group. Pain score and analgesic consumption were analyzed. There was no significant difference in acute pain relief between the study and control groups.

Keywords: Acute burn; Pain; Lignocaine.

Introduction

Pain is a major problem after burns and researchers continue to report that pain from burns remains undertreated. The inadequate pain control results in adverse sequelae physically and psychologically in the burn victims [1].

The main therapeutic option for analgesia has been the use of opioids. The use of opioids associated with well-known side effects and dependence is most problematic [2]. Other analgesic modalities have been tried in this patient population with minimal success. In recent times and in the setting of burns pain, there has been growing evidence that lignocaine can improve the analgesic efficacy, alleviate the deleterious effect of opioid administration, and minimise the necessity of escalating opioid dosage in patients with thermal injury [3].

In this study we analyze the effect of topical local anesthetic for pain relief in acute burn pain.

Case Report

This is a preliminary result of an ongoing thesis work of Post Graduate Resident of Plastic Surgery in a tertiary care Institute. Aim of study was to evaluate the role of topical lignocaine solution in pain management of acute burn in first 24 hours. The inclusion criteria were all Patients >13 years with thermal burns of extremity of 1st and 2nd degree presenting within 24 hours of occurrence, conscious and co-operative. Patients with 3rd and 4th degree burns, Old burns (>1 day), Burns with eschar and patients with renal/hepatic impairment were excluded from the study.

All acute burn patients attending the study centre during the study period who meet the prescribed criteria were explained about the study. After obtaining informed consent patients will be included in the study. Patients were randomly allotted into two groups control group (saline application) and treatment group (topical lignocaine) application. Baseline VAS (visual analog score), renal and liver function were documented. Limited Access Dressing (LAD) was applied to the extremity (Figure 1) and wound irrigation with topical 2% lignocaine solution and analgesia with oral ketamine was given on demand or if VAS score >5. In the control group saline irrigation and analgesia with oral ketamine was given on demand or if VAS score >5. Visual analog scores for pain were evaluated hourly for first eight hours and 2nd hourly for the second eight hours and every 4 hours for next 8 hours. Top up dose of lignocaine was given every 8 hours after wound

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lavage with saline. Analgesic consumption over 24 hours was noted. Any adverse effect was noted. The VAS scores for pain and analgesic dose requirement over 24 hours in the two groups were noted.

In our study the mean age was 30±5 years. Female were more than males (ration 3:2). The average percentage of burn was 9%. Upper extremity was more commonly affected than the lower extremity. The mean pain score at admission in both the groups was 8(out of 10). After admission, the mean scores at 8 hours, 16 hours and 24 hours in the control group were 4, 4, 2 and study group were 4, 3, and 2. The total analgesic consumption (ketamine in mg) was 384 mg in study group and 408 mg in control group. On comparing the mean score of both the groups it was found that there was no significant difference but statistical analysis is yet to confirm as the study is going on. No significant adverse effect was noted in both the groups.

Discussion

Burns cause significant pain and disability. Pain associated with burn injuries is not of a single type. Many different patterns of pains are described. So each pattern of pain is managed with a particular protocol. The most common patterns described are the background pain, breakthrough pain, post-operative pain and the procedural pain [4].

In a review on pain management in burns, it was concluded that pain in burn is affected by a complex array of factors. So a multidisciplinary approach is the critical step in management of pain. But this is further complicated by the varying analgesic requirements due to the various procedures these patients undergo during their course of hospitalisation. So it is diffcult to determine the required standard daily dose of analgesic drug [5].

Opioids are the mainstays of treatment of burn pain in most burn centres. It is understood that the doses of opioids for pain relief in burn can far exceed the usual recommended doses. So the use of opioid sparing agent is crucial for pain effective pain relief.

Ketamine is an anesthetic agent which acts as an antagonist at NMDA receptor. It also has analgesic effect. Ketamine is a safe and effective drug and its use in burn dressings have been proven.

Local anesthetics have been shown to reduce the production of pro inflammatory mediators and so reduce the pain, edema and post burn ischemia [6]. Most commonly intravenous lignocaine was used for assessing opioid sparing effect. But the results were inconclusive.

Jellish et al. in their study on the skin graft donor raw areas applied topical local anesthetics for analgesic effect, 2% lignocaine or 0.5% bupivacaine or saline applied topically over the SSG donor site immediately after harvest. Topical lignocaine group had reduced analgesic consumption [7].

In our study we did not find significant reduction in total analgesic consumption. This could be due to the short duration of action of lignocaine. So we need to top up the doses frequently or use longer acting drugs like bupivacaine.

Limitation of the study: Statistical analysis not done as it is a preliminary result of an ongoing study. Blood levels of the drug were not monitored.

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Case Report

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Incarcerated Inguinal Hernia with Ovarian Torsion in a Neonate: An Acute Emergency

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Abstract

Inguinal hernias in the newborn age group are rarely encountered. In the affected female patient, the ovaries, fallopian tubes, and the intestines may be seen in the hernia sac. The early diagnosis of torsion in cases in which the ovary is herniated into the inguinal canal is of utmost importance in order to give surgery the chance of reduction and correction. In this paper, a case of an ovarian herniation into the inguinal canal with the presence of torsion and incarceration is being presented.

Keywords: Female Inguinal Hernia; Newborn; Ovary; Torsion.

Introduction

Indirect inguinal hernia is the most common congenital anomaly in the pediatric age group. But newborn inguinal hernias are encountered with a frequency of 1-2%, and the female/male ratio ranges between 1:4 and 1:10 [1]. About 15-20% of hernias in infant girls contain ovary, sometimes with a fallopian tube [2, 3]. Despite the possibility of a spontaneous regression in some cases [4], the presence of ovaries and/or intestinal structures in the inguinal sac decreases the chance of regression, while also increasing the chance of incarceration [5-7]. The normal anatomy is altered when an ovary is trapped in a hernia sac, and these changes make torsion more likely. Ovarian ischemia may arise in case the pedicle of the herniated ovary rotates around itself. An irreducible ovary is at significant risk of torsion causing vascular compromise. Because of this reason, an early diagnosis of the situation is crucial in order to salvage the ovary before an irreversible damage happens. This risk warrants treating the asymptomatic irreducible ovary as any other incarcerated hernia as a true emergency [6]. In this paper, a case of an ovarian herniation into the inguinal canal with the presence of torsion and incarceration is being presented.

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Case Report

A 25-day-old neonate with a left-sided, painful inguinal swelling for the last 2 days was brought to the emergency department. The baby was anxious and she was in a steady state of intense crying. At physical examination, a tender mass was palpated in the left inguinal region, just above the labium majus. After physical examination and radiological evaluation (ultrasonography), the diagnosis of incarcerated inguinal hernia of the ovary was made. At color Doppler ultrasonography, vascular signals were not obtained from the ovarian tissue, thus indicating nonviability, and leading to a consideration of ovarian torsion. Because of the long-standing history and color Dopplor findings, she was taken to the operation room without an attempt for manual reduction. Intraoperatively, the torsion of the ovary with distal fallopian tube (Fig. 1) within the indirect hernia sac was seen. Detorsion of pedicle of the ovary was done. Despite the ovary being judged intraoperatively as moderately to severely ischemic even after detorsion (Fig. 2), oophorectomy was not

done. Hernia repair was performed after reducing ovary through internal ring to the pelvis. Follow-up color Doppler sonogram after 1 month showed normal ovary.

Fig. 1: Intraoperative photograph showing torsion of the ovary with distal fallopian tube within the indirect hernia sac

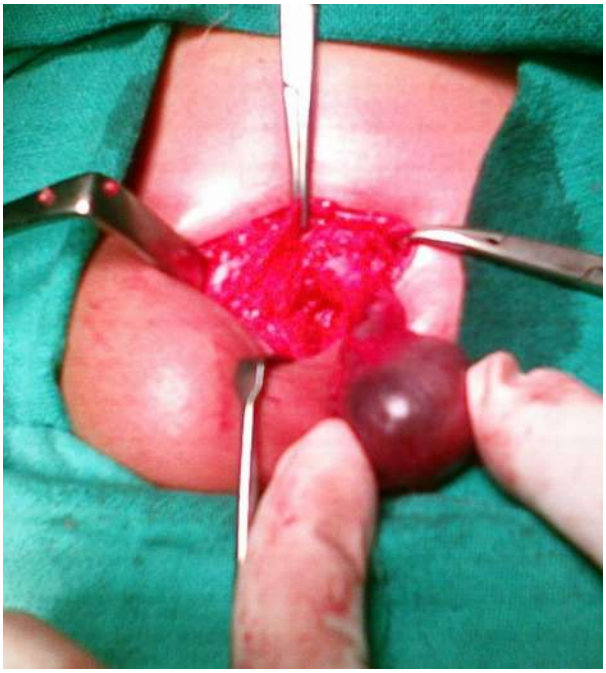
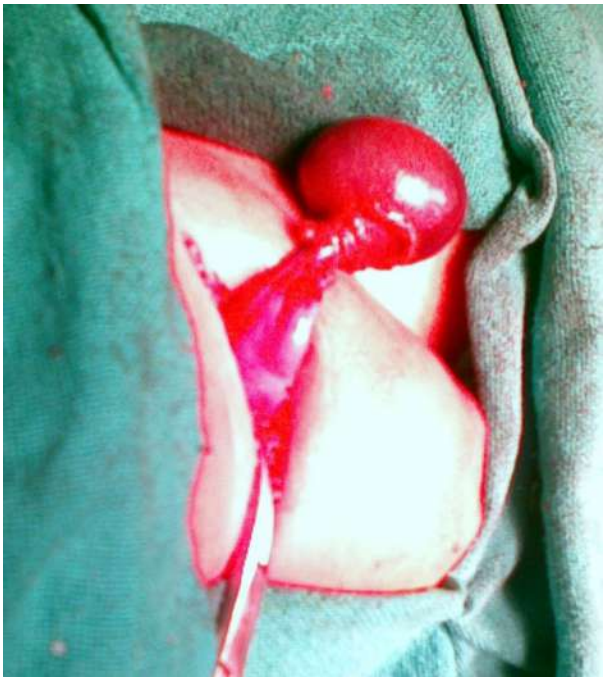


Fig. 2: No change in the color of the ovary after untwisting



Discussion

In the female, the counterpart structure of the processus vaginalis which extends into the inguinal canal is known as the Nuck diverticulum [8]. The persistence of this peritoneal opening is defined as the Nuck cyst [9]. This peritoneal sac usually gets obliterated by the 8th gestational month [10]. Anomalies in the nonobliterated canal may lead to the development of inguinal hernias [9]. In prematurity situations, the delivery is accomplished before the closure of this canal, thus increasing the risk of the development of an inguinal hernia [8]. In addition, it has been reported that the risks of herniation and torsion are increased in cases in which the fallopian tubes are rather long and thus the ovaries more mobile [11].

Inguinal hernias may contain the intestines, omentum, testes, ovaries, and fallopian tubes. These structures may incarcerate. It has been reported that the most important complication of inguinal hernias in the pediatric age group is incarceration, which was found in a study to have a frequency of 31% [12]. In another study it was found that the majority of the painful inguinal swellings in the infancy are related to incarcerated hernia [13]. Incarcerated ovary in hernia sac has the risk of torsion and strangulation. The ovaries come first among the structures that incarcerate in the inguinal hernia sac. In a series of 1000 inguinal hernia cases, ovarian incarceration was reported to be present in 43% of the cases [14]. In a study by Merriman et al, in all cases of ovarian torsion within an inguinal hernial sac the primary aetiological event was torsion of the ovary and tube on its pedicle whilst suspended from the neck of the hernial sac [15]. The possibility of sustaining ovarian damage as a consequence of an inguinal hernia becoming strangulated is secondary to compression of ovarian vessels by an entrapped bowel loop. In another study done by Boley et al., it was reported that all of the 15 cases in the series had inguinal hernia sacs that contained non-reducible ovaries and that none of the sacs contained intestinal ingredients [6].

Once an ovary was noted in a female hernia sac on examination, repair was suggested soon thereafter to avoid incarceration, possible torsion, and strangulation, and if strangulation was found, regardless of its questioned viability, neither was it removed nor should it be removed [6,16,17]. The treatment option varies from manual reduction to surgical intervention, depending on the duration from beginning of swelling to the time the exact diagnosis was made. Even though the presence of

short-term history and the lack of peritoneal irritation findings which are indications for a manual reduction, the suspicion of an ovarian torsion should be raised for ovaries within the incarcerated inguinal hernia, and ovarian viability should be considered before an attempt of manual reduction. Most pediatric surgeons perform oophorectomy in girls presenting with ovarian torsion in which the ovary appears necrotic. However, the adult gynecology literature suggests that many ovaries can be treated by detorsion alone. Simple detorsion was not accompanied by an increase in morbidity, and patients had functioning ovarian tissue on follow-up despite the surgeon's assessment of the degree of ovarian ischemia [16]. Detorsion is the procedure of choice for most cases of ovarian torsion in children.

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Case Report

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Urethral Length in North-Indian Adult Male Population

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Introduction and Objective

Per urethral interventions are so commonly performed procedures in any urology clinic in our country but surprisingly there is no population-based data available regarding normal male urethral length [1]. Scanty literature from the West has been the reference backbone till today and there is no database available from India [1]. Hence, we are presently using the devices designed for the Western population [3]. Catheters are at least more than 1½ times the average length of the urethra, indicating a need to perhaps customize the catheter and instruments for our population. Urologists are still comfortable doing calibration/dilation for treatment of urethral stricture disease. Hence, it is very important to know the normal urethral length and the stretched penile urethral length to estimate the stricture location within the urethra.

Materials and Methods

From January 2013 to June 2013, 200 admitted adult male patients who required catheterization as part of regular treatment were taken as study subjects. Patient consent and ethics review board clearance was obtained. Patients with urethral abnormalities were excluded. No. 16F Foley's catheter has been used as the standard for the measuring purpose. Its balloon was inflated using 10 cc of saline. The length from the junction of the balloon to the 'Y' junction of the Foley was measured. The catheter was then passed into the bladder and reinflated to same volume. The penis was gently straightened and the length of the catheter outside the penis (external urethral meatus) was measured till the 'Y' junction. Subtracting this from the original catheter length gave the measured length of the urethra. Stretched penile length was also measured from symphysis pubis in every patient.

Procedure

16F Foley Catheter

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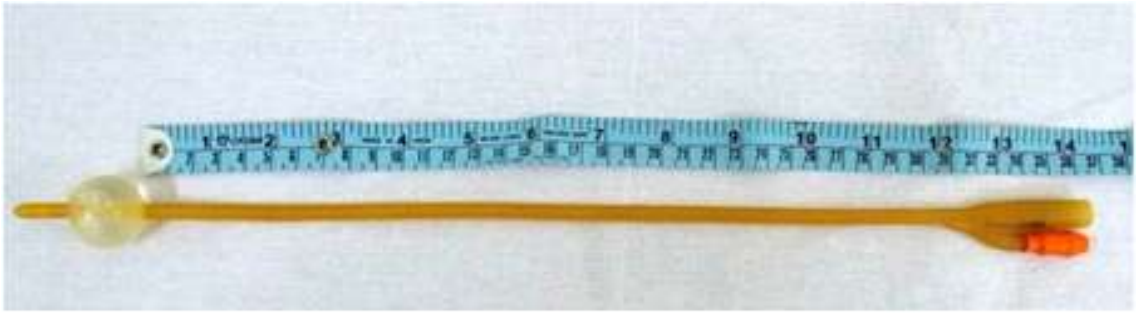
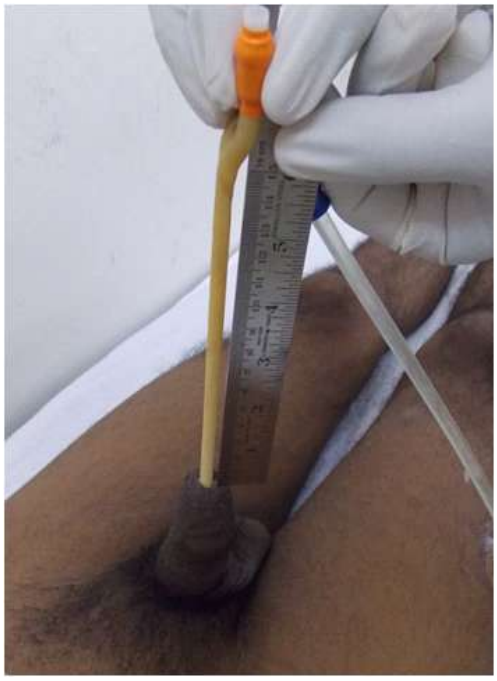
Foley balloon inflated with 10cc saline



Catheterized patient.

Urethral length- flaccid penis



Urethral length- stretched penis

Stretched penile length

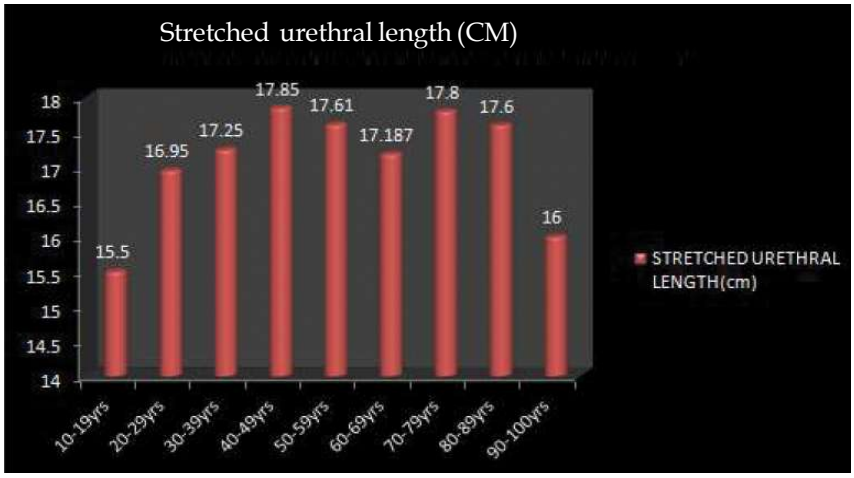
Data analysis and Result

Data was collected between January 2013 to June 2013. Data analysis was done on completion. 200 male patients were in the study group. They were of age range 17-90 years, mean age group was 54.51 years. First, the length of the urethra was calculated with penis in the flaccid phase (mean length-15.459cm, SD-1.541), then the penis was put on gentle stretch and the urethral length was again measured (mean length-17.392cm, SD-1.7). The range of stretched urethra was 15-21.3 cm and the maximum urethral length was measured in the age group 70-79 years. Next, the stretched penile length was measured from pubic symphysis to tip of the glans penis (mean length- 10.553, SD-1.2, range- 8-14cm). The maximum penile length was seen in the age group 17-39years. The statistical analysis has been shown in appropriate chart and graphs.

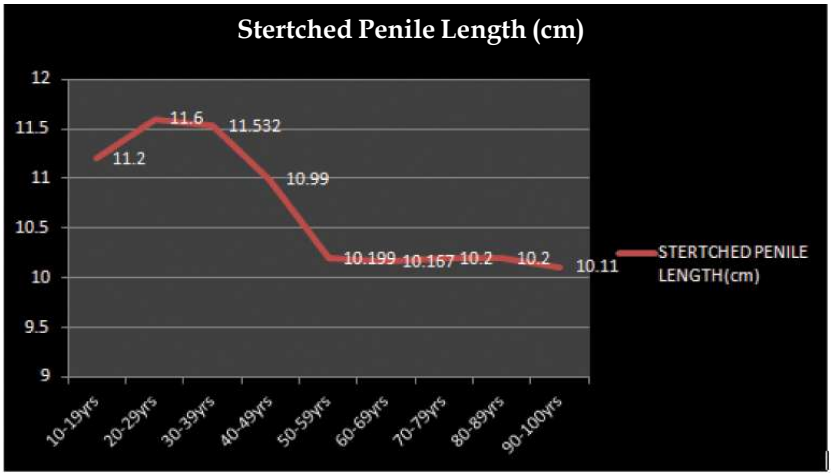
Stretched urethral length and stretched penile length according to the age group

Age Group (yrs)	Mean Urethral Length (cm)	Mean Penile Length (cm)
10-19	15.5	11.2
20-29	16.95	11.6
30-39	17.25	11.532
40-49	17.85	10.99
50-53	17.61	10.189
60-69	17.18	10.167
70-79	17.8	10.2
80-89	17.6	10.2
90-100	16	10.11

Bar diagram showing normal distribution of urethral length in different age groups



Line diagram showing normal distribution of penile length in respective age groups



Discussion

The length of male urethra is what we get to know from the western literature [1,2,3]. We are presently using the catheters and other urethral devices designed for the Western population. Therefore the Foley's catheters that we take into use are actually meant for the western population. The full length of a Foley's catheter is 40cm and the 'useful length' is 30 cm.

Urologists must have a good knowledge of the normal male urethral length. It becomes essential to estimate the level of the urethral stricture from a RGU film and to utilize the same while calibrating/ sounding of the male urethra [1]. We would also like to attach the importance about the knowledge of stretched penile length. While doing urethral calibration or a RGU film we always put the penis under 'stretch' and that is why to estimate the level of the stricture down the line we should have an exact idea about the stretched urethral length [5, 6].

The various means of measuring male urethral length are: retrograde urethrogram and micturating cystourethrogram, magnetic resonance imaging (MRI) and flexible cystoscopy [2, 4]. However, all of these methods require adequate expertise and instruments. So, measuring the male urethral length using a Foley's catheter is much simpler and cost effective.

The mean urethral length was found to be (17.392cm, SD-1.7) in our sub-population and the range of stretched urethra was 15-21.3cm.

The variation in urethral length has been largely attributed to differences in penile and prostatic urethral lengths. The length of prostatic urethra ranges from 2.5–4.5 cm as per the published data. Age-related prostatic hypertrophy is expected to result in an increase in overall urethral length (as seen in the age group 70-89years, in our study). But it is probably counter balanced by the possible age-related atrophy of periurethral tissues. Similar is the case with penile urethra as seen in our study, there is a decrease in the length of stretched penis after 55years of age. Therefore the difference in the overall urethral length is only minimal in this older age group.

The length of the catheter that we use (40cm) is almost twice the length of male urethral length in our sub-population (range 15-21.3cm). This indicates a need to perhaps customize the catheter and instruments for our sub- population. Also there seems no basis putting these long catheters in female subjects where the urethral length is only 3-4 cm. Thus a decrease in the size of the urethral catheters and instruments is likely and this would bring down the production cost for the same which will be beneficial to both the manufacturers and consumers.

Conclusion

There is hardly any data regarding the male urethral length in Indian population. Therefore there is a need to build up a strong database on male urethral length in our country. This data would help to devise instruments and catheters suitable for Indian sub-populations, in the future.

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Case Report

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An Interesting Case of Endometrial Stromal Nodule

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Abstract

Endometrial stromal tumours (EST) are a type of uterine mesenchymal tumour which account for less than 10% of all uterine sarcoma and approximately 1 % of all uterine malignancies.

Endometrial stromal nodule (ESN) is the least common type of EST and it forms less than 0.25% of all EST. It should be carefully differentiated from other stromal sarcomas, which can change the final prognosis. We are presenting a patient with an interesting case of ESN who underwent a total abdominal hysterectomy.

Keywords: Endometrial Stromal Tumours; Endometrial Stromal Sarcomas; Endometrial Stromal Nodule; Sarcomas.

Introduction

The endometrial stromal tumours are rare variety mesenchymal tumors with cytological features reminiscent of endometrial stromal cells [1].

The classification of endometrial stromal tumor is difficult and complicated [2, 3]. The recent World Health Organization classification of uterine stromal tumors is ESN, undifferentiated endometrial sarcoma (UES), endometrial stromal sarcoma (ESS).

The ESN is a benign tumor with well-differentiated endometrial stromal cells forming a well-circumscribed nodule with largely smooth, non-infiltrative margins. ESN occurs at any age during reproductive or later years. Most are incidental findings in a hysterectomy specimen. Few cases present with abnormal uterine bleeding.

Pelvic imaging cannot reliably differentiate these tumors from leimyomas or sarcomas.

Majority are immuno-reactive for progesterone and estrogen receptors. Typically, they are positive for CD-10 and negative for Desmin and H Cadesmin.

Case study

A 46 years old perimenopausal lady presented with excessive bleeding during menses for one year with secondary dysmenorrhea. She had a flow of 7 to 8 days duration with dysmenorrhea for the first 2 days. On general examination mild pallor was there. In systemic examination, there was a firm mass in the midline, arising out of pelvis, nontender, and approximately 14 weeks size. The cervix was normal and uterus was enlarged, firm and approximately 14 weeks size. Ultrasound pelvis revealed enlarged and bulky uterus with endometrial thickness of 12mm with intra-mural fibroid of 8 cm x10 cm. Pre-operative diagnosis of fibroid with abnormal uterine bleeding was made. Total abdominal hysterectomy with bilateral salpingo oophorectomy was done.

Histopathological examination (HPE)

Macroscopy

A light yellowish colored mass of approximately 10 x 8 cm, infiltrating into the endometrial cavity and surrounding myometrium.

Microscopy

Section study showed a circumscribed tumor composed of cells, arranged in closely packed clusters, sheets and concentrically around blood

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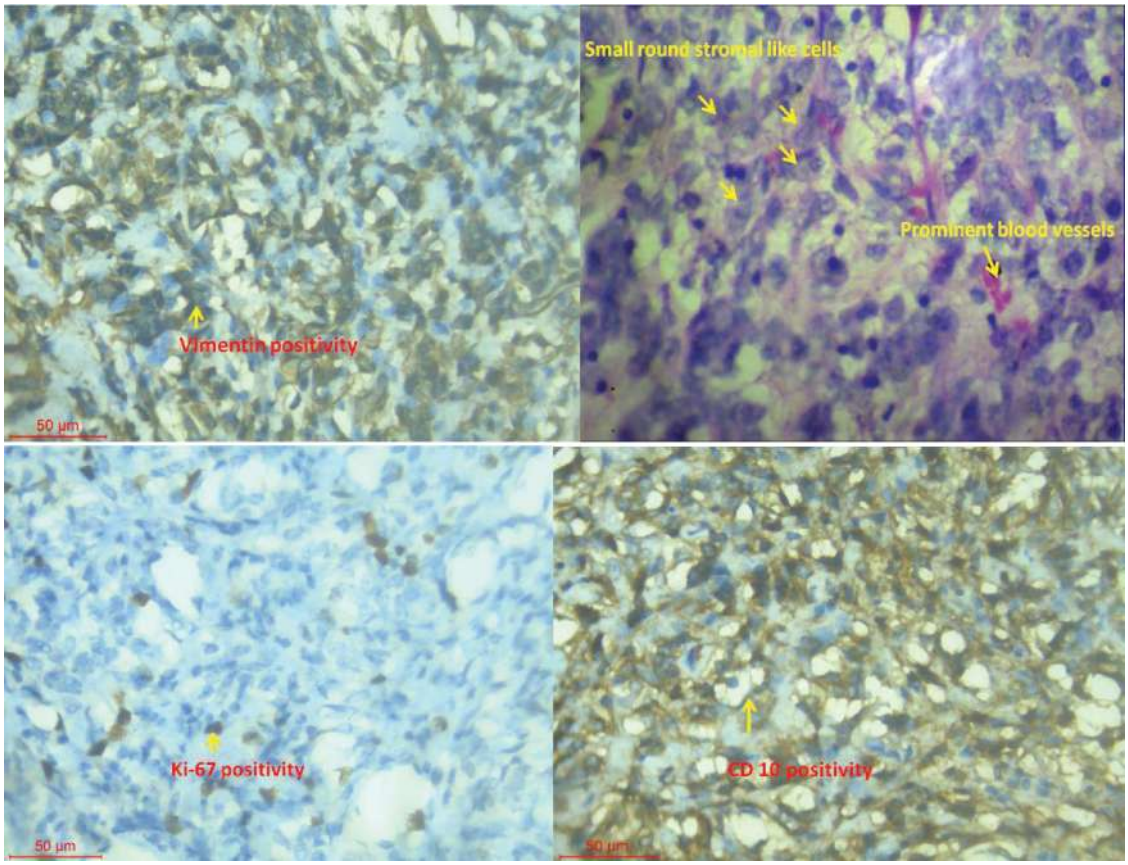
vessels. Tumor cells have scanty cytoplasm, round to polygonal vesicular nuclei, lacy network of hyalanized stromal matrix and scanty lymphocytic infiltrate.

Immunohistochemistry (IHC)

The IHC revealed the oval cells positive for Vimentin and CD10. Ki 67 proliferation index is 6-8%. Hence a final diagnosis of endometrial stromal nodule was made.

The patient has been followed up periodically for a period of one and half year and is in good health.

Fig. 1: Photograph of immunohistochemistry



Discussion

ESTs are the least common neoplasms of the uterine corpus, with an annual incidence of about two per million women [1–4]. ESN is a rare subtype which accounts for less than five percent of uterine tumors [5–7].

EST is classified by tumor invasiveness, with respect to margins and the degree of stromal differentiation. Therefore immunohistochemistry (IHC) and the presence of molecular alterations are used to classify these tumors more precisely.

Although large series of ESTs often include ESN, they are usually few in number [8]. There is only one large series of cases reported by Tavassoli and Norris in 1981, about 60 cases of ESN [9] and one probable group of 11 cases in the older literature [10]. Dionigi published a series there were only four endometrial stromal nodules [11]. Amanjit published 1261 endometrial neoplasms from January 2001 to December 2004, in which 5 cases of EST and one case was diagnosed as ESN [12]. ESN has been defined as a well-circumscribed EST and may have focal irregularities or finger-like projections into the adjacent myometrium are acceptable if none of them exceed 2 to 3 mm [8,9]. This tumour commonly involve the myometrium or endometrium or both.

ESNs occur primarily in peri- and postmenopausal women. Tavassoli and Norris [8,9] reviewed 60 women with ESNs; the median age was 47 years. The patients may present with vaginal bleeding, anemia, pelvic or abdominal pain or discomfort, or may be asymptomatic [5,6,8,13]. Our patient had secondary dysmenorrhea with menorrhagia. The most common preoperative

diagnoses were leiomyoma and adnexal masses [1,13].

As the majority of patients are beyond childbearing years, a hysterectomy is usually required; it permits the thorough evaluation of the tumor margin too, which is necessary to distinguish a benign stromal nodule from a stromal sarcoma [3,14]. However, in contrast to stromal sarcomas, patients with stromal nodules have remained free of disease and no recurrences were noted following hysterectomy [9,13].

In a curettage specimen, distinction between ESN and low-grade ESS is difficult, unless the tumor is very small and the margins can be fully evaluated. In women of reproductive age who desire to preserve fertility, diagnostic imaging and hysteroscopy may be used to follow up tumor growth. In some cases, hormonal therapy with local excision may be successful. In the series reported by Tavassoli and Norris, six patients underwent simple excision of the uterine nodules. One patient had a hysterectomy 4 years later for endometrial hyperplasia, and the pathologic evaluation revealed no evidence of stromal tumor. The other five patients were followed upto 10 years with no evidence of recurrence [9]. Schilder [13] published a successful hormonal therapy (leuprolide acetate) in decreasing the size of a low-grade endometrial stromal sarcoma, local excision of the tumor with preservation of reproductive function. Although the receptor status of stromal nodules has not been studied, their similarity on a cellular level to low-grade stromal sarcomas suggests that a trial of hormonal therapy in this case, when conservative management was desired, might be successful.

Our patient aged 46 years was avid neither for pregnancy nor for a conservative treatment, hence underwent a total abdominal hysterectomy with bilateral salpin goophorectomy.

Macroscopically, the tumor is characteristically a solitary, well-delineated, round fleshy nodule with a yellow to tan sectioned surface. The median tumour diameter is 4 cm (range 0.8 to 15 cm). It was 8 x 7 x 3 cm in our case. About two thirds are purely intramural without any apparent connections to the endometrium. In our case it had infiltrated the endometrial cavity(hence the reason for menorrhagia) and remaining part was in the myometrium. Occasionaliy tumors are cystic, but foci of necrosis and hemorrhage are rare.

Differential diagnosis of an ESN depends on microscopic findings.

The histological appearance found endometrial stromal nodules with areas of epithelial-like structures that resemble ovarian sex cord tumors. The stromal nodules have expansile, noninfiltrative margins that compress the surrounding endometrium and myometrium. Minor irregularities of the margin are common, but invasion of the surrounding myometrium indicates that the tumor is a stromal sarcoma, not a stromal nodule [11,15].

In our case, the tumor expressed the CD10, vimentin and the Ki-67 proliferation index was 6 to 8%. Immunostaining for AML (alpha smooth muscle), desmine, calretinin, cytokeratin AE1/AE3, and inhibin were negative.

ESN with focal sex cord-like differentiation tend to relapse and metastase. In Clement and Scully initial report, three of five patients with follow up had recurrences and two died [16].

Conclusion

There is no reliable preoperative diagnostic procedure to identify this tumour. Clinical presentation is nonspecific. Hysterectomy is the treatment of choice. The diagnosis is done on microscopic and IHC examination. The margins of tumour must be determinate to differentiate it from invasive stromal tumors. Considered as benign tumor, the prognosis is excellent when the diagnosis is sure.

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Case Report

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Cost Effective Tissue Expander for Post Burn Neck Contracture

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Abstract

Traditionally used tissue expander is costly and needs a large incision and major procedure for its insertion. Incision used for expander insertion can jeopardize the vascularity near the wound, gives a cosmetically unacceptable larger scar and also can make the site unsuitable for use as a flap. This article presents use of Foley's catheter with inflatable bulb tissue expansion to facilitate the primary closure of wound in a case of post burn contracture.

Keywords: Tissue Expansion; Foley's Catheter; Post Burn Contracture.

Introduction

Tissue expansion is a procedure in which the body is stimulated to generate extra soft tissue by the application of stretching forces which, over a period of time, results in expansion of the tissue. Several types of tissue expanders exist, based on shape, size, surface, type of filling valve, number of filling valve etc. Expanders can be standard, customized, anatomic to the site (e.g. breast expander), differential in fill volume to provide tapering of tissue. Tissue expansion is becoming highly useful method in plastic surgery in various surgeries at different sites. Tissue expander if used at suitable site, in a timely manner and in a planned way can significantly improve the outcome of definitive surgery as it facilitates primary closure or reduces the defect size to the extent where requirement of cover (skin graft/ flap) becomes lesser in size. Genesis of modern day tissue expansion is credited to Radovan and Austad. However First tissue expansion was reported by Codvilla, 1905 for elongation of femur by traction. Despite these early efforts, it was not until 20 years after Neumann's report that tissue expansion was revisited. Neumann of New York, 1950 was the first surgeon to use tissue expander for soft tissue. Various innovations has been done in the field of tissue expansion and self inflating device was discovered by Eric Austad, 1982 [1,2,3]. In 1982, the first National Tissue Expansion Symposium was sponsored by Plastic Surgery Educational Foundation (PSEF), marking the recognition of a new advance and field in reconstructive surgery.

Since that time expansion has been applied to a multitude of reconstructive problems with applications demonstrated in both regional expansion and expansion at distant sites for subsequent graft and flap transfer. Better understanding of expansion has allowed many modifications in flap design, increasing its worth as a reconstructive option [4].

There have been several more technically advanced tissue expanders that have been developed, such as osmotic-gradient–driven self-expanding devices [5]. Conventionally, a neck contracture is treated by release of contracture and cover by skin graft or flap cover. When contracture is mild in nature with band like contracture then Z-Plasty can be used to close the wound after release of contracture but due to contracted tissue and unavailability of laxed surrounding tissue Z-plasty may become difficult to execute. Expansion of tissue around the contracted band may help in felicitating in doing Z-plasty. Conventional expanders are costly and may not be available. Foley's catheter with expandable balloon may be used as a safe alternative for tissue expansion.

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Methodology

The present study was conducted in the Department of Plastic Surgery, JIPMER, Pondicherry. Detailed history and examination was recorded. Investigations were done to rule out systemic diseases and for anesthesia fitness. Underlying co morbidities (anemia, hypoproteinemia, infection) were controlled before reconstruction. 16 Fr Foley's catheter was inserted as an expander inside the healthy skin around the wound under local anesthesia under all aseptic precautions (figure 1). The Foley's catheter was inserted by making a separate incision of 0.5 to 1 cm away from the propose incision. Foley's catheter was inserted by making tunnel under the skin using artery forceps. After insertion of Foley's catheter the bulb was kept near the wound margin. Port site was sutured and catheter was fixed with suture.

Two Foley's catheters were required. The bulb of the Foley's catheter was started inflating immediately on the day of insertion. 0.5 cc to 1 cc of distilled water was used to inflate the bulb daily or alternate day, depending upon the patient's tolerance to the tissue expansion. The process of expansion of bulb was continued till the desired expansion was achieved or the capacity of the bulb (50 cc) achieved. On the Day of reconstruction, Foley's catheter was removed and contracture release was done and primary closure was achieved without tension over suture line.

Case Summary

A 30 year old lady with alleged history of thermal burn 7 month back, presented to the outpatient department with inability to extend the neck. Detailed history and examination was performed. A contracture band was found at the flexor aspect of neck extending from base of the neck to the mandible measuring of 15 x5 cm. Surrounding skin was found to be scarred with reduced laxity. Patient was investigated and pre anesthetic work up was done. First surgery was done under local anesthesia and two Foley's catheters were introduced. Port site was closed and catheter was fixed.

Serial expansion of bulb was started daily by using 0.5 to 1 cc of distilled water which was increased later depending on patient's tolerance to pain. Total 50- 70 ml of distilled water was used in both catheters. At the end of expansion sessions patient was posted for definitive surgery. Contracture

Fig. 1: Foley's catheter which was used as an expander

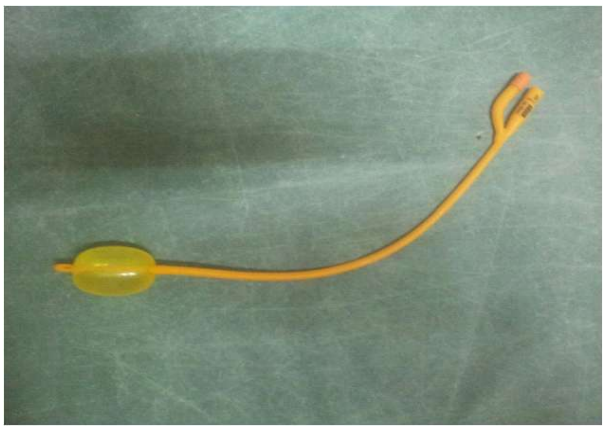


Fig. 2: Pre operative photo of scar

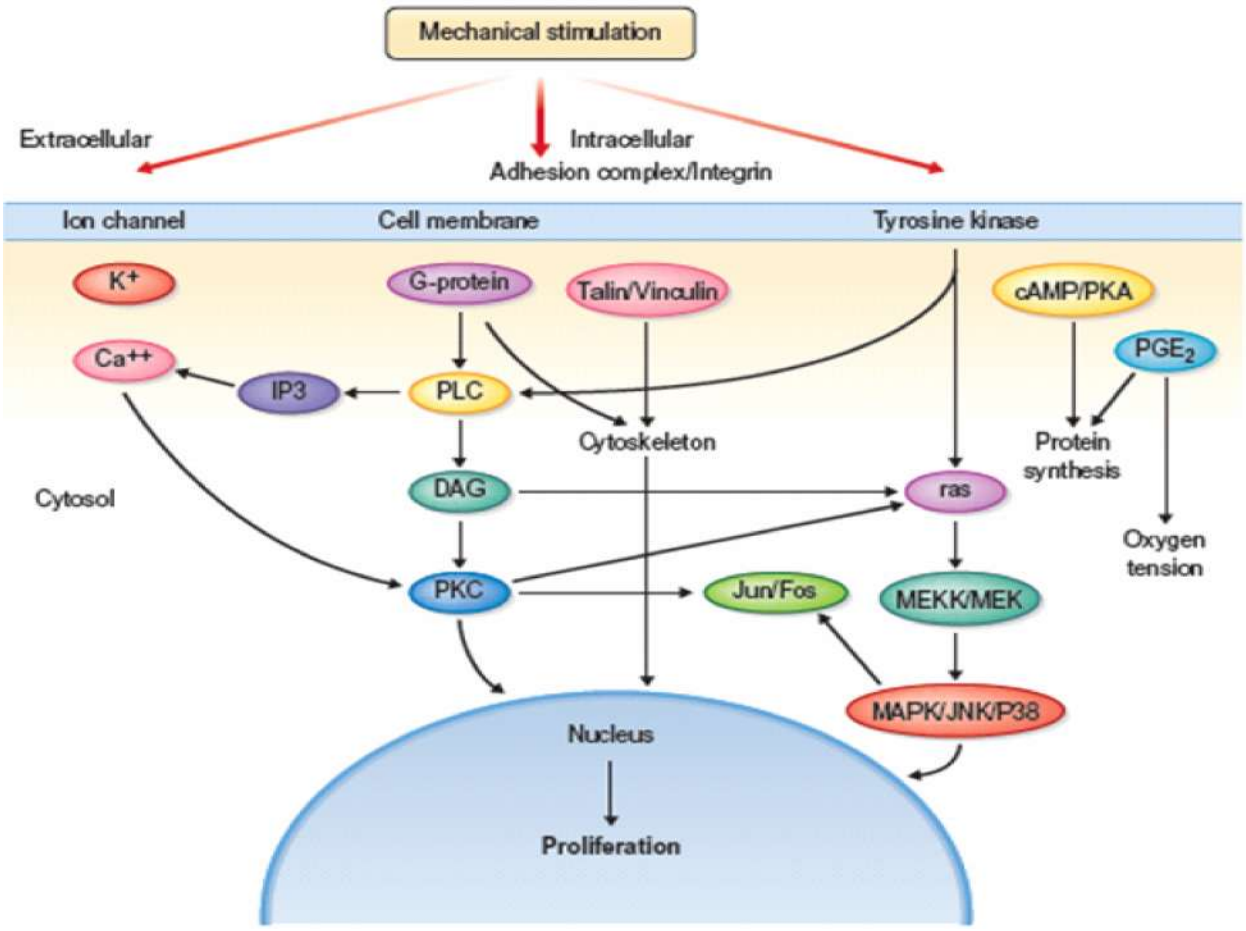
Fig. 3: Showing Foley's catheter with inflated bulb

Fig. 4: Patient with proposed incision and Foley's catheter in situ

Fig. 5: Post operative photo showing all flaps closed primarily

released was one by multiple Z- Pasty technique and closure of all flaps was achieved without tension. Postoperatively patient was managed with antibiotics, analgesics and other symptomatic drugs. Sutures were removed after 10 days. Wound healed adequately and no wound dehiscence was noticed.

Fig. 6: Showing cellular and molecular basis of tissue expansion



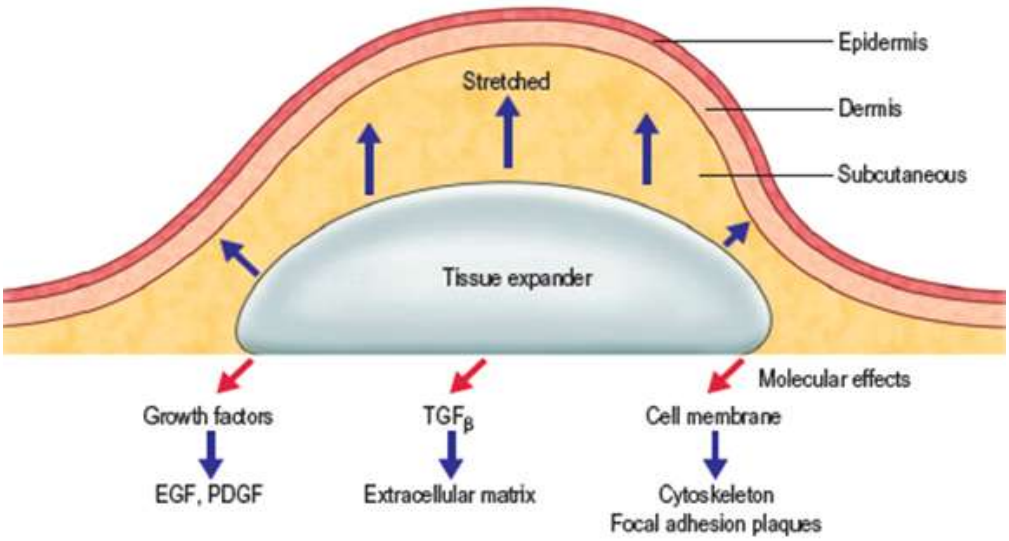
Discussion

Creep is the basic phenomenon responsible for tissue expansion. Creep is the tendency of a solid material to move slowly or deform under the influence of mechanical stress. Creep can be of two types - Mechanical creep and Biological creep. Tissue expansion is a reliable method of providing additional cutaneous tissue; thereby optimizing contour and color match in given reconstructive effort (figure 6) [6].

Various effects of tissue expansion are as follows-

- Increased Surface area
- Thickening of Epidermis
- Thinning of Dermis
- Alignment of Collagen fibrils
- Improved vascularity
- Elongation of Nerves
- Elongation of Bone

Fig. 7: Showing effects of tissue expansion on surrounding tissue



- Capsule formation (figure 7).

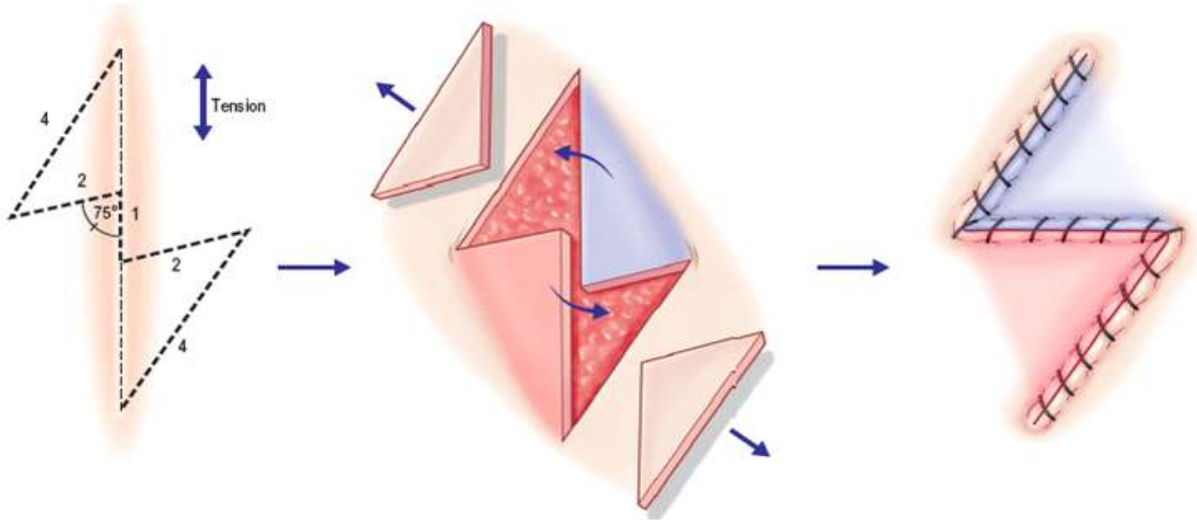
This enhanced vascularity and compensatory increased circulation has been shown to improve random-pattern flap survival compared with control skin [6]. However, after removal of the expander, the epidermal thickness gradually returns back to normal after 4–6 weeks. The pilosebaceous elements are well preserved, although they may be compressed on histological examination. Hyper pigmentation is noticeable because of hyperactivity of melanocytes

Fig. 8: Commonly used expanders available

during expansion, however, it returns back to normal slowly after removal of the expander [7].

The shapes of the expanders are of three types: round, rectangular, and crescent etc. Expander volumes have a wide range and vary according to the anatomic site. Saline is delivered in a controlled fashion via the valve port, which is either integrated into the prosthesis or connected to the device by silicone tubing of customized length (figure 8). The present study highlights the cost effective method of tissue expansion in wound management.

Fig. 9: Planning and principles of Z-plasty



When a constant mechanical stress is applied to skin over time, two phenomena occur: mechanical creep and biological creep. Mechanical creep is based on morphologic changes that occur on a cellular level in response to the applied stress—the cell is stretched. Disruption of gap junctions and increased tissue surface area result in cell proliferation (biologic creep).

During placement of conventional tissue expander proper Infiltration, planned incision, careful raising of flap, minimum handling of device, Hemostasis, Pocket irrigation, tubing and port placement, perfect wound closure etc. are the necessary and challenging steps for the surgeon.

Port related problems especially port displacement is of great concern in conventional expander.

Z-plasty refers to transposition of two triangular flaps, usually of equal size and equal angle, into each other's defect. Planning and performing Z-plasty requires an under-standing of geometric principles. Laxity of surrounding tissue is used to incorporate into the contracted area (figure 9).

We used Foley's catheter as an alternative of conventional tissue expander. Various advantages of Foley's catheter over conventional expander can be summarized as follows:

Available in small sizes

Cost effective

Easily available

Requires small incision for placement

Easy placement by subcutaneous tunneling method

Maintain integrity of local tissue to be used as a flap

Minimum dissection

Minimum chances of seroma and infection

Conclusion

Based on our case Foley's catheter bulb could be used as a safe, simple and cost effective alternative of low volume tissue expanders. Especially in certain circumstances like Unavailability of small expanders and Unaffordability by the patient.

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Case Report

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Diode Laser Assisted Hypospadias Repair

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Abstract

Surgeons used to feel cumbersome with skin bleeding while making surgical Incisions using scalpel. Even though we are traditionally using scalpel for skin incisions, incisions made using electromagnetic radiation of high frequency in the form of laser are considered to be of more cosmetic value, less time taking, less bleeding, less post-operative pain, no ill effects on wound healing.

Key words: Diode Laser; Hypospadias; Snodgrass Repair.

Introduction

Skin bleeding is a common problem after starting surgery. A continuous skin bleeding may obscure the operating field, and the surgeon feels discomfort, number of gauze pieces, suture material, and precious operating time is also wasted. The usage of laser decreases skin bleeding and total operative time also shortens.

The first laser was introduced by Maiman in 1960 [1], who used ruby to make laser. After a while, CO2 (Carbon Dioxide) Laser and Neodymium Doped Yttrium AluminiumGarnet (Nd: YAG) lasers were developed. In medical field, laser was first used for photocoagulation of retina in 1960 [2].

Today, there are different types of lasers available for use: CO2, Nd: YAG, Holmium Yttrium Aluminium Garnet (Ho: YAG), (Erbium, Chromium doped Yttrium Scandium Gallium Garnet) Er,Cr: YSGG, Neodymium doped Yttrium Aluminum Perovskite (Nd: YAP), Gallium arsenide (GaAs) (diode), and Argon [3].

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In comparison with conventional scalpel, laser has many benefits, such as ease of soft tissue ablation, hemostasis [4], instant sterilization, reduced bacteremia, little wound contraction, reduced edema, minimal scar, reduced mechanical trauma, less operative and post-operative pain [5-7].

Case Summary

The patient, a thirteen year old boy presented with a subcoronal hypospadias. Patient after evaluation underwent Snodgrass repair under general anesthesia.

Wavelength specific goggles were worn by the operating surgeon and persons in the operating room. Patient's eyes protected using the eye shield. Markings were made by the operating surgeon. Penile tourniquet applied and artificial erection created. Traction sutures placed. The skin incision was made using diode laser with a frequency of 850nm and 1.7W, instead of using scalpel. It was noticed that bleeding was minimal and the precious time under general anaesthesia was remarkably less. Dissection of glans wing and urethral plate done. Tubuluraization of urethral plate done. A 6F sialistic stent plate and incision closed in layers using 6.0 polyglactin.

Fig. 1: Preoperative photo of patient

Fig. 2: Photo of diode laser console and probe

Fig. 3: Intraop photo demonstating laser being used for incision

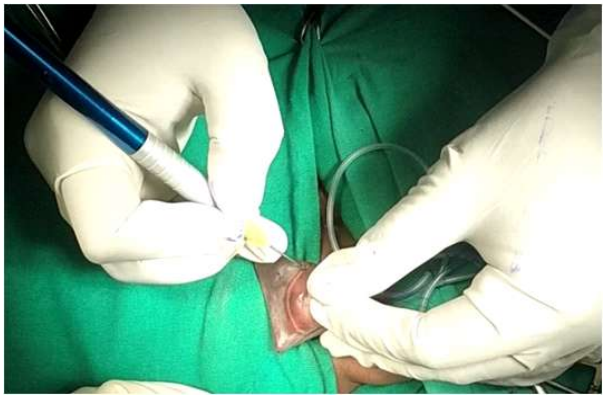

Fig. 4: Post op photo

The skin incision was closed with PDS 6.0 and this procedure had no deleterious effect on the skin and the wound healed adequately.

Discussion

One of the most widely used applications of lasers is soft tissue surgery and ablation of lesions. The advantages of laser application are relatively bloodless surgery, minimal swelling, scarring and coagulation, reduction in surgical time and less or no post-surgical pain. Also, the laser instantly disinfects the surgical wound as well as allowing a noncontact type of operative procedure and therefore no mechanical trauma to the tissue.Laser transmits energy to the cells causing warming, welding, coagulation, protein denaturation, drying, vaporization and carbonization.

The diode laser was introduced in dentistry and oral surgery in the mid-90s [6-8]. The diode laser devices have specifications such as relatively small size, portable and lower cost that attract the dental practitioners and oral surgeons for use in various surgical indications in comparison to other laser equipment. The pump source is an electrical current, the photons are produced by electric current and laser active medium is semiconductor. The diode lasers have been used in three

wavelengths 810,940 and 980nm in surgical treatments. Provided correct selection and application of diode lasers in soft tissue surgery, for example frenectomy, epulis, fissuratum, fibroma, facial pigmentation and vascular lesions, they are safety and useful.

In almost all researches the scientists declared the unique specialties of lasers and particularly diode lasers such as; sharp and definite cutting edge, hemostasis and coagulation after surgery in addition to small size and better maneuver during application, which makes this laser very effective and a useful alternative device in soft tissue surgery in comparison to other lasers types such as Carbon Dioxide Laser (CO_2) and erbium lasers.

The disadvantages reported in researches on diode laser application were somehow similar to other lasers, like, delayed repair which is prominent in larger lesions and charring tissue in smaller lesions compared to the application of conventional scalpel surgical procedures and laser plume in excision of exophytic lesions produced by human papilloma virus and may be creates similar lesions in upper respiratory tract of laser operator not high enough to do so. Laser induced wounds because of definite and clean wound, generally heal well compared to scalpel incisions. This is may be due to the minimal degree of wound contraction following laser irradiation which occurs through induction and formation of smaller number of myofibroblasts and collagen [11,12].

Conclusion

Our case demonstrated diode laser can be used in hypospadias surgery safely because of easy application, better coagulation with less bleeding, less operative time and no undesirable effects on wound healing.

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Esophageal Atresia Associated with Anorectal Malformations: Importance of the Size of Gastric Bubble in Deciding the Stages of Surgery

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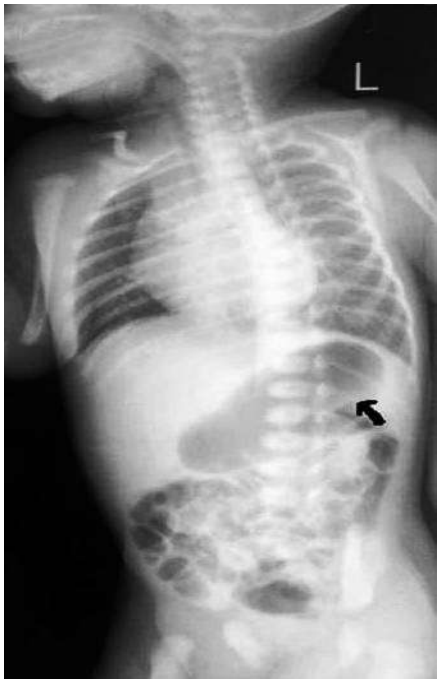
Dear Sir,

Esophageal atresia (EA) with a distal trachea-esophageal fistula (TEF) may lead to excessive distention of the stomach due to inhaled air passing through the distal fistula [1]. Gastric distention and subsequent perforation has been described in patients with EA and TEF who require assisted ventilation, where the air may be preferentially pushed through the fistula into the stomach, leading to its dilation and perforation [2, 3]. Gastric perforation can be a complication in EA patients with a distal TEF, even in the absence of preoperative mechanical ventilation [4]. Stomach distention may occur in patients with EATEF without assisted ventilation if the fistula is large. Reflux of bile and gastric contents through the large fistula to trachea-bronchial tree further damages the lung in addition to saliva from upper pouch.

As per the study by Singh et al, the day of presentation and abdominal distension had no significant effect on survival of neonates of EATEF associated with ARM [5]. But in patients with EATEF associated with ARM, abdominal distention increases with the day of presentation and risk of gastric perforation increases if the distal TEF is large. So in these patients after initial stabilization, as the first stage procedure for the surgical management of ARM i.e., anoplasty for low ARM and colostomy for high and intermediate ARM, distal TEF should be tackled either by thoracotomy and ligation or by bronchoscopy and fogarty catheter occlusion. Some surgeons put catheters through the distal TEF to decompress the stomach as the first stage during ARM surgery.

Patients with EATEF associated with ARM who presented with stomach and abdominal distension usually require ventilatory support after first stage of ARM surgery. In the post operative period the risk of gastric perforation will increase due to further increase in distention of stomach and has significant effect on survival. So in patients with EATEF associated with ARM the size of gastric bubble is important in deciding the stages of surgery.

Fig. 1: X-ray chest and abdomen antero-posterior view with red rubber catheter in upper esophageal pouch of a case of esophageal atresia and tracheoesophageal fistula associated with high anorectal malformation (Arrow: Distended stomach)



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