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Original research article

A study of surgical treatments and complications of inguinoscrotal swellings in children

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Abstract

Most inguinal hernias are found either by parents, during a well-baby or preschool check. There is usually a history of an intermittent bulge appearing in the groin, scrotum, or labia, especially noted at times of increased intra-abdominal pressure such as crying or straining. It may be present at birth or may not appear until weeks, months, or even years later. Hernias are usually asymptomatic. Parents are frequently concerned that the hernia may cause the infant to be irritable or have a loss of appetite The most important aspect of the management of neonatal inguinoscrotal swellings relate to its risk of incarceration, strangulation which include gangrene of bowel, testis and ovaries. A prompt early and appropriate treatment is necessary to avoid various complications.

Keywords: Surgical, treatments, complications, inguinoscrotal, swellings, children

Introduction

There is usually a history of an intermittent bulge appearing in the groin, scrotum, or labia, especially noted at times of increased intra-abdominal pressure such as crying or straining. It may be present at birth or may not appear until weeks, months, or even years later. Hernias are usually asymptomatic. Parents are frequently concerned that the hernia may cause the infant to be irritable or have a loss of appetite. In most cases the only complaint is the appearance of the groin swelling, which disappears when the patient relaxes, either spontaneously or with gentle manual pressure. Older children may complain of groin or inguinal pain during exercise. This pain may be vague and chronic, or sharp and fleeting. If a loop of bowel becomes entrapped in a hernia, the patient becomes extremely irritable and develops intense pain, followed by signs of intestinal obstruction (abdominal distension, vomiting, and absence of flatus/stool). Vomiting is common in incarceration, and is usually secondary to visceral distension. If bile- stained vomitus is seen, then intestinal obstruction must be suspected. If the hernia is not reduced, the blood supply may be compromised leading to perforation and peritonitis. This process can occur within 2 hours. As such, the urgency to reduce a suspected incarcerated hernia is of the highest priority. Incarceration occurs more frequently within the first 6 months of life. It becomes less common after the 2nd year and after 5 years of age it is relatively rare. Occasionally a patient may present with symptoms of intestinal obstruction without a history of an inguinal hernia. Infancy is the most common time for this to occur. All pediatric patients with intestinal obstruction, regardless of age, should be examined for an incarcerated hernia. A small groin hernia in an overweight baby may be overlooked easily. In textbooks and systems of surgery the problem of hernia in children is often dismissed with a few sentences, or the principles governing treatment in adults are unconcernedly applied to children [1].

Inguinoscrotal swellings are one of the commonest conditions in pediatric age group. Inguinal hernias in children are found in 10-20 per 1000 live births [2]. Hernias and hydrocoeles are common conditions, and inguinal herniotomy is one of the most frequently performed surgeries. Hernia is derived from the Greek word 'Herons' means 'offshoot' or 'bulge' or 'budding'. In Latin, it means rupture of a portion of a structure. It can be defined as a "protrusion of a viscus or part of a viscus through a normal or an abnormal opening in the wall of its containing cavity".

With the increase in the number of premature deliveries, the incidence of neonatal inguinal hernia and hydrocele is increasing [3]. Inguinal hernia occurs in 1 to 5 percent of all newborns and 9 to 11 percent of those born prematurely [4]. Most of these swellings are diagnosed by either a parent who notices a bulge when a child is straining or crying, or by a physician during a routine physical examination. The characteristic bulge in the groin which disappears at times and then recurs may not be present at the time of examination, however, and the surgeon may be compelled to rely on the description given by a competent observer.

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The most important aspect of the management of neonatal inguinoscrotal swellings relate to its risk of incarceration, strangulation which include gangrene of bowel, testis and ovaries. A prompt early and appropriate treatment is necessary to avoid various complications [5].

Aims and Objectives

1) To study the various complications like irreducibility, incarceration, obstruction and strangulation.
2) To study the postoperative complication rate.

Materials and Methods

The present study is a Prospective hospital based study conducted in Department of General Surgery, Kanachur Institute of Medical Sciences, Mangalore. In this study, 50 patients were selected by a simple random sample. The study was done from Nov 2016 to May 2018.

Inclusion criteria

All the selected patients 12years and below including both male and female patients who presented with swelling in inguinoscrotal region admitted to Department of General Surgery.

Exclusion criteria

All Patients above twelve years of age are excluded from the study.

1. Patients who refuse surgery.
2. Patient with systemic disorder not able to undergo surgery.
3. Patient with acute scrotal swelling like torsion of testis, epididymoorchitis, funiculitis, lymphadenitis and also other swellings like varicocoele, lymph varix, cuticular and subcutaneous swellings and malignant extensions from testis.

After taking detailed history, all the registered patients were examined systematically which included examination of inguinal and groin region, scrotum and its contents. Respiratory system, cardiovascular system and per abdomen were also examined to know other associated congenital conditions like undescended testis and other connective tissue disorder.

Simple investigations like hemoglobin %, bleeding time, clotting time, routine urine examination were carried out for fitness for operation. Children with unilateral inguinal hernia underwent US examination for CPPV.

After proper evaluation of preoperative condition, the patients are then taken up for surgery after informed / written consent.

Injection Ceftriaxone 20mg /Kg/body weight was given before each operation.

Operative procedure

Surgery was decided by age. If the children <1 year of age, Mitchell banks operation is selected where in herniotomy done without opening the external oblique aponeurosis. If the children >1 year of age, Fergusson technique is selectedwhere in herniotomy done after opening the external oblique aponeurosis, under suitable anesthesia as decided by anesthesiologist.

The findings are recorded and the patients are monitored post operatively for complications. The patients were usually discharged from the hospital on the 1st or 2rd postoperative day.

Postoperative follow up of the cases were done after one week, 4 weeks and 12 weeks from the date of operation.

Observation and Results

Associated congenital conditions

In this series, there were 20 cases of hydroceles of which 12 were on the left side and 8 on the right side. There were 3 cases of encysted hydrocele of the cord, 2 were on the left side and 1 on the right side.

There were 4 cases of undescended testis, 2 cases were on the left side and 2 cases were on the right, all located in the inguinal pouch. They underwent orchidopexy at the time of hernia repair and the testis was placed in the subdartos pouch.

No case was associated with hypospadias.

Table 1: Associated Congenital Conditions

SI No	Associated Congenital Conditions	No of cases	Percentage
1	Congenital Hydrocoele	20	40%
2	Encysted hydrocele of Cord	3	6%
2	Undescended testis	4	8%
3	Hypospadias	0	0

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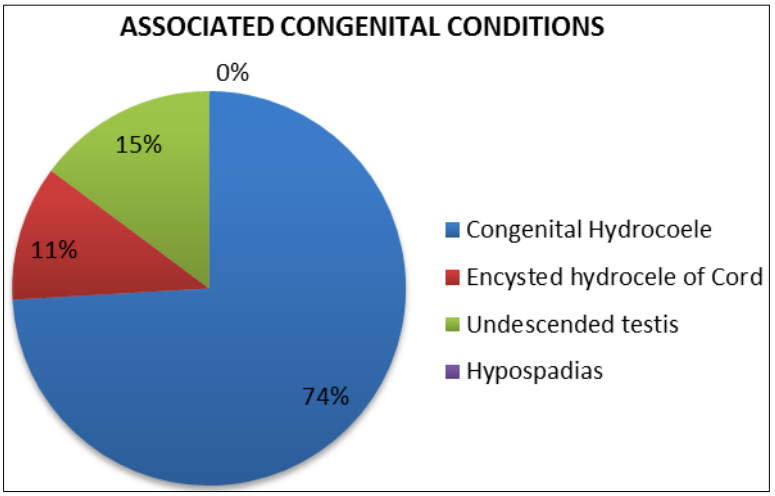

Fig 2: Associated Congenital Conditions Graph

Operative technique for herniotomy

Of the total 50 patients, 1 patient (2%) underwent Mitchell Banks Surgery and Ferguson technique was done for 49 patients (98%).

Table 2: Operative Technique for Herniotomy

Operative Technique	No of Patients	Percentage
Mitchell Banks Surgery	1	2
Fergusson technique	49	98

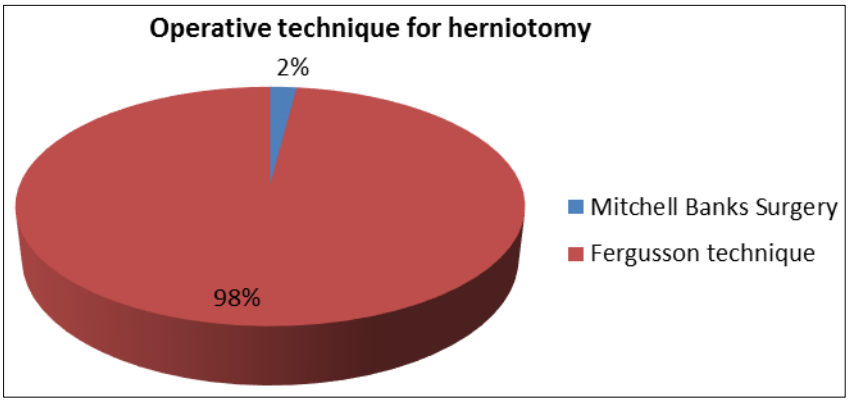

Fig 3: Operative Technique for Herniotomy

In this study, simple herniotomy with or without complete excision of the sac was done for all the cases. Mitchell banks operation was done for 1 (2%) case that was below 1 year, where in, herniotomy was done without opening external oblique aponeurosis. Ferguson technique was done for 49(98%) cases that were above 1 year, where in herniotomy done after opening the external oblique aponeurosis. Herniotomy was done with or without complete excision of the sac. In case of partial excision for male child, the distal portion was kept slit open to prevent hydrocele formation whereas in the case of female the distal portion of the sac was completely removed. The hernia sac for every female patient was always widely opened and inspected before twisting and ligating.

High ligation of the PPV at the deep ring was done in case of congenital hydrocele while the distal portion was kept slit open.

Complications

In this series of 50 children, there were 4 cases of incarceration. But none had strangulation and gonadal infarction.

Post-operative complications

In the post-operative period of 50 children, there were 2 cases of wound infection, 1 case of seroma and no case of stitch granuloma.

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Table 3: Postoperative Complications

SI No.	Post Op Complication	Incidence	Percentage
1	Wound Infection	2	4
2	Seroma	1	2
3	Stitch Granuloma	0	0

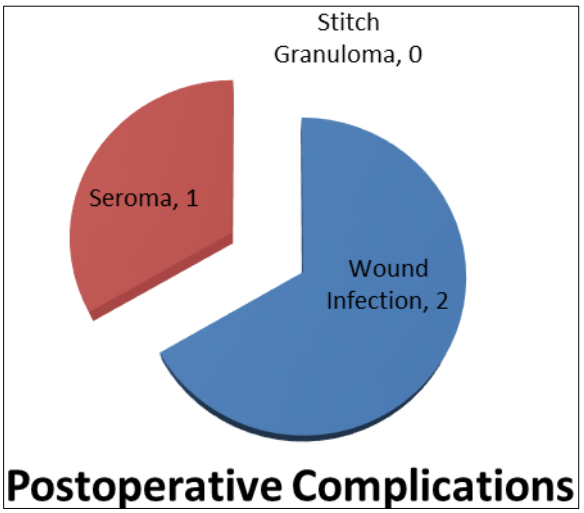

Fig 4: Postoperative Complications Graph

Recurrence

During the period of 2 years of study and follow up period of 12 weeks, there was no recurrence noted.

Discussion

Associated congenital conditions

1. Undescended Testis

During the course of this study, 4(8%) cases of undescended testis were detected, two of them were on the right side and two of them were on the left side, all four were situated in the superficial inguinal pouch. These patients had orchiopexy at the time of hernia repair and testis was placed in the subdartos pouch. A study on 461 orchidopexies by Meijer RW *et al*. showed that in 281 of these cases (86.0%), the testis was located in the superficial inguinal pouch (SIP). In our study also the same finding was noted [6].

In a study conducted by Adesunkanmi AR *et al*., Undescended testes constituted the commonest associated operative finding in about 5% of the patients of the 208 patients who had presented with 237 inguinal or inguinoscrotal hernias [8].

Table 4: UDT Distribution

SI. No	Author	UDT
1	Adesunkanmi AR *et al*. [7]	5.85
2	Hugh B. Lynn [8]	8
3	Frederick J. Rescorla[9]	19%
4	Karabulut [10]	2%
5	Present study	8%

The figures in the present study correlates well with other studies mentioned.

2. Encysted hydrocele of the cord

There were 3 (6%) cases of encysted hydrocele of the cord, 2 on the left side and 1 on the right. All had PPV. This study is in accordance with Duckett J.W *et al*. who found 25 hydroceles of the cord (6.5%) in 380 hernia operations he had conducted [11].

3. Congenital hydrocele

There were 20(40%) cases of congential hydrocele of which 12 were on the left side and 8 on the right. All of them had high ligation at deep ring while the distal portions were kept slit open.

Thomas E. Simpson operated on 536 children for inguinal hernia and found Hydrocele to be associated in 189 cases (35.3%) [12].

In a study conducted by Sigmund H Ein *et al*. on 6361 infants and children with inguinal hernia, hydrocoeles were found in 19% [13]. A similar incidence was noted by Hugh B Lynn when he studied 240

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inguinal hernia in children and found 17% were associated with hydrocele.
Willis J. Potts in a study of inguinal hernia in 600 children found hydrocele tobe associated in 9% of the cases.[1] Venugopal S while treating 271 cases of inguinoscrotal hernias and hydrocele at the University Hospital of West Indies found that 12.5% of the cases were hydroceles [14].
Ninety-nine children with inguinal hernia undergoing elective surgery over a 2-year period at the University College Hospital, Ibadan, were studied.
Ipsilateral hydrocoeles were noted in 8% of the operated children [15].
Karabulut in a study of inguinal hernia in a 3 year study of inguinal hernia in 4012 infants and children found that hydroceles were present in 6.2% associated hernias. Most of the hydroceles were right-sided 72%, 20% left-sided, and 8% bilateral [10].

Table 5: Congenital Hydrocele Discussion

Author	Congenital hydrocele (%)
Karabulut [10]	6.2%
Okunribido O [15]	8%
Willis J. Potts[1]	9%
Venugopal S[14]	12.5%
Thomas E. Simpson[12]	35.3%
Present Study	40%

4. Hypospadias

Out of 50 cases in this study, association of hypospadias was not observed in any of these cases. According to Andre Hebra, hypospadias is associated with an increased risk of inguinal hernia [16]. A similar finding was noted by Wu WH *et al*. that observed in his study that inguinal hernia was the most common urogenital condition associated with hypospadias with a prevalence rate of 12.4% [17].
Hundred and thirty patients with hypospadias were studied between 1983 and 1990, and inguinal hernia was present in 3.8% [18].
The disparity in our finding could be because of the small sample size.

Table 6: Hypospadias Discussion

Author	Hypospadias (%)
Wu WH *et al*. [17]	12.4
Kulkarni *et al*. [18]	3.8
Present Study	0

Complications

In our study, incarcerated hernia was noted in 8% of patients. But there were no case of strangulation and gonadal infarction Incarcerated hernia was diagnosed in 16 patients (7.7%) of 237 patient's studied [19].
Incarceration and its complications are preventable if early herniotomy is done after diagnosis and without any delay [20].
The less number of complications in this series could be attributed to small sample size, larger number of elective cases and fewer emergency that were operated in time.

Operation

All the cases were treated by Simple herniotomy under general anesthesia. For congenital hydrocele, the procedure followed was high ligation of the PPV at the deep ring and keeping the distal portion slit open. There was no operative or postoperative morbidity or mortality related to congenital hernia surgery in this series. All incarcerated hernia was treated by elective surgery after reduction.
Rowe *et al*. recommended elective surgery after reduction, since it has a lower rate of complication compared to emergency surgery [21].
Controversy exists for routine C/L exploration in presence of a clinical inguinal hernia. Recent 'Inguinal Hernia' guidelines of the Association of Surgeon of the Netherlands there is no indication for routine C/L exploration. Despite the significant risk of developing a C/L hernia in children with left sided hernia, the authors do not recommend routine right-sided exploration as the frequency is not high [22].

Postoperative complications

In the postoperative period of 50 children, there were 2 cases of wound infection and 1 case of seroma, amounting to 6% postoperative complication. No other complications were noted. All of them responded to conservative treatment.
Of the Eight hundred and sixty-five inguinal herniotomies that were performed on 827 children, the postoperative complication rate for elective was 6.6% [23].
In a six years retrospective review of 397 herniotomy in 380 children up to the age of 10 years, 16(4%) postoperative complications were encountered [24].

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Table 7: Postoperative Complications

SI No	Author	Postoperative Complication (%)
1	Omar *et al*. [23]	6.6%
2	Carneiro *et al*. [24]	4%
3	Present study	6%

Recurrence

During the period of 1 & ½ years study and follow up period of 12 weeks to 52 weeks, no recurrence was noted.

Recurrent inguinal hernias are relatively uncommon. Reports from most children's document an incidence of 1% to 2% [23].

The recurrence may be associated with comorbid conditions including increased abdominal pressure, prematurity, malnutrition, and anemia and connective tissue disorders. Recurrence is also seen more frequently after an initial operation for incarcerated hernia. The repair of a child's hernia is not a parlor piece, but a master's work and should be performed or supervised by a skilled surgeon.

Conclusion

An inguinal hernia will not resolve spontaneously and should be repaired as soon as possible after the diagnosis. Postoperative complications are usually rare following elective operation. Recurrence is usually rare if operated by experienced surgeons.

Clarity in decision making and following meticulous operative techniques can avoid the complications in a procedure that can be gratifying equally for both the surgeon and the child. Inguinal herniotomy in children is a safe and effective operation.

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