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Study of Inguinal Hernia Treatment Outcome in Pediatric Age Group and their Complications

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ABSTRACT

This study aimed to know the clinical presentation of inguinal hernia in children, to study management of inguinal hernia in children and their post-operative complications. The present study was carried out in 30 children who were operated for inguinal hernia and hydrocele at the Department of General Surgery. The initial diagnosis was made from the history and clinical examination. The inguinal hernia was most common among male children (86%) thereby giving a ratio of M: F=6.6:1. The children were aged day 1-12 years and most of the patients presented around 2-7 (50%) years and. Right sided (60%) inguinal hernia was more common than left (30%). In 93% of cases the swellings were asymptomatic in presentation with 7% of patients having acute presentation. In 43% of cases average duration of symptoms was from 1 month to 1 year. USG is a good alternative tool for diagnosing CPPV, detected 2 cases out of which 1 case had C/L hernia during follow up. The most common associated anomaly was hydrocele (30%) and undescended testis (7%). Other associated anomaly is hypospadias in 1 case. In 9 cases of hydrocele, 6 were on the right side and 3 were on the left, and 2 had patent processus vaginalis. Mainstay of treatment of these swelling was surgical. All operations were elective and 80% of the operations were performed under general anesthesia. In 30 cases herniotomy was done. 7% of cases treated with Mitchell banks procedure and 93% of cases treated with Ferguson technique. In all cases high ligation of hernial sac was performed. For female patients, the hernial sac was always widely opened and inspected for the entrapment of ovary or other structures before twisting and ligating at its neck. The post operative hospital stay ranged from 6 hours to 2 days, average being 1.2 days. The 2(7%) undescended testes were on the right side and in the superficial inguinal pouch. They had archetypes at the time of hernia repair and the testis was kept in the subdartos pouch. The most common abdominal organ found in the sac was small intestine followed by omentum. Out of 26 male patients, 1 patient had incarcerated hernia (3%). This patient was treated primarily by reduction. In the post operative period of 30 children, there were 2 cases of wound infection and 1 case had hypoglycemia. All of them responded to conservative treatment. During the period of 2 years study and follow up period of 12 weeks to 24 weeks, 1/30(3%)case had recurrence. Inguinal herniotomy in children is a safe and effective operation done as Day care procedure but risk of hypoglycemic shock has to be kept in mind which can be a grave consequence of Day care surgery.

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Key Words

Inguinal herniotomy, hypoglycemic shock, ultrasonography

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INTRODUCTION

Sir Percivall Pott, described hernias in 1756 as: "The disease which makes the subject of the following tract, is one in which mankind are, on many accounts, much interested. No age, sex, rank, or condition of life, is exempted from it, the rich, the poor, the lazy and the laborious, are equally liable to it., it produces certain inconvenience to all who are afflicted by it, It sometimes puts the life of the patient in such hazard, as to require one of the most delicate operations in surgery and it has in all times, from the most ancient down to the present, rendered those who labor under it subject to the most iniquitous frauds and impositions[1]. Inguinoscrotal swellings are one of the commonest anomalies in infancy and Childhood throughout the world. Among the inguinoscrotal swellings, inguinal hernia and hydrocele top the list in frequency. They represent the conditions most frequently requiring surgical repair in the pediatric age group. Hernia is a Latin term meaning 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[2]. As a result of improved neonatal intensive care, more and more premature babies are being delivered and consequently the incidence of neonatal inguinal hernia and hydrocele is increasing.
All pediatric inguinal hernias require operative treatment to prevent the development of complications, such as inguinal hernia incarceration or strangulation.

Aims of the Study: To know the clinical presentation of inguinal hernia in children, to study management of inguinal hernia in children and their post-operative complications.

MATERIALS AND METHODS

Study Population: All Patients fulfilling the inclusion criteria with diagnosis of inguinal hernia.

Sample Size: 30.

Inclusion Criteria:

- Patients with confirmed diagnosis of inguinal hernia.
- Patients age ranged up to 12 years.
- Patients whose parents willing to be part of the present study.

Exclusion Criteria:

- Patients with obstruction, strangulation, perforation.
- Patients with congenital heart diseases developmental anamolies.
- Patients whose parents are not willing to participate in the study.

Congenital inguinal hernia were diagnosed by taking detailed history from parents in the form of site, size, variability of size, history of non-reducibility or any underlying straining for micturition or presence or absence of testis in scrotal sac, were collected in a prescribed proforma which contains history, clinical examination, investigation and management in one year time bound study. After obtaining the history children were examined systematically which includes examination of inguinal and groin region, scrotum and its contents. Respiratory system, cardiovascular system and per abdomen to know other associated congenital anomalies like undescended testis and other connective tissue disorder. Children were subjected to routine investigations like Hb%, BT, CT and USG for CPPV. Children with unilateral inguinal hernia underwent US examination using a 7.5-MHz linear transducer. If a CPPV was visible as a hydrocele owing to the inflow of physiologic ascites into a processus vaginalis on straining, then US scanning were performed while the patient was at rest and while inducing straining by standing or crying. A groin with a hydrocele in the inguinal canal on straining was diagnosed as a CPPV and cases were followed for 1 year to know development of C/L hernia. Female children with hernia were evaluated ultrasonography of abdomen. After proper evaluation of preoperative condition and appropriate preparation, surgery is considered. Surgery is 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 selected where in herniotomy done after opening the external oblique aponeurosis, under suitable anesthesia as decided by anesthesiologist. After the surgery, children were nursed in post-operative ward with one dose of IV antibiotics. Post-operative complications were being taken care off. Observed for 6 hours and finally decided to discharge once patient is fit for discharge on the same day. All patients were asked to attend the General surgery OPD for follow-ups.

RESULTS AND DISCUSSIONS

The age of the patients ranged from day1-12 years. They were divided into 12 groups, each with a gap of 1 year. The maximum numbers of cases were in the age group of 5-6 years 5/30 (16 %) and the minimum number was in the age group 6-7 years1/30(3.3%). 16/30 (53.3%) of cases were between 2 to 7 years. In this study of 30 cases, 26/30(87%) cases were males and 4/30(13%)cases were females, the ratio being 6.6:1. Among these 30 cases, 18/30(60%) cases were on the right side, 9/30(30%) cases on the left side and 3/30(10%) cases were bilateral. Of those 18 cases on the right side,14 were boys and 4 were girls. Among the 9 cases on the left side and 4 bilateral, all were

boys. In the present study the duration of symptoms, up to 1 week seen in 1/30(3%) case, from 1 week-1 month seen in 2/30(7%)cases, from 1 month-1 year is seen in 13/30(43%) cases and next from 1 year-5 years in 11/30(37%) cases, <5 years duration of symptoms seen in 3/30(10%) cases. In the present study 28/30(93%) cases presented as asymptomatic swelling, 2/30 (7%) cases have acute presentation. In the present study all 30(100%) cases are presented with indirect inguinal hernia only. There were 9/30(30%) cases of hydroceles of which 6 were on the right side and 3 on the left side. There were 2/30(7%) cases of undescended testis. All were on the right side and located in the inguinal pouch. They underwent orchidopexy at the time of hernia repair and the testis was placed in the sub dartos pouch. 1/30(3%) case was associated with Hypospadias.

Preoperative Sonograpic Evaluation of CPPV: In our study 27/30(90%) cases (25 boys and 2 girls) with unilateral inguinal hernia underwent US examination using a 7.5 MHz linear transducer. In 27 cases 2 cases (6%) were diagnosed by US as CPPV. Out of 2 cases 1 was on right side, 1 one left and all were boys and all are below 2 years. 1 case developed C/L inguinal hernia on right side after 6 month. In our study 24/30(80%) cases received GA, 3/30(10%) cases received caudal block (0.25% bupivacaine, 1 ml/kg) and 3(10%) cases received spinal anesthesia. Postoperatively it was noticed that patient were comfortable with caudal block (good analgesia) compared to other types.

Operative Technique for Herniotomy: All cases underwent Herniotomy. Mitchell banks operation was done for 2/30(7%) cases that were below 1 year, where in, herniotomy was done without opening external oblique aponeurosis. Ferguson technique was done for 28(93%) 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 hernial sac for every female patient was always widely opened and inspected before twisting and ligating. Sliding component was not found in our study. In the case of associated hydrocele, who were having PPV high ligation of the patent processus vaginalis at the deep ring was done and distal portion was kept slit open. The most common abdominal organ found in the sac was small intestine in 24(80%) cases followed by omentum in 6(20%) case.

Post Operative Analgesia: Postoperative analgesics were provided on a routine basis and were consist of either acetaminophen suppositories (10mg/kg every 4 hours for 24 hours, then as needed) or diclofenac suppositories in children more than 1 year or caudal block. For 27/30(90%) cases intraoperative rectal suppositories was put at the end of surgery and observed that 90% of cases were comfortable and were not required additional analgesia. For 3 cases caudal block given, it was observed that post operatively these patients were comfortable without additional analgesia up to 6 hours after surgery.

Duration of Hospital Stay: Most operations are performed on an Day care basis and sent on day of surgery. 1 case had inadequate pain control and 1 case had emesis and were kept under observation in the recovery room. 1 case that were discharged on the day of surgery had emesis and came next day in unresponsive state with pin point pupil due to hypoglycemia. Patient recovered after infusion of 25% Dextrose. Average duration of stay was 1.2 days.

Complications: In this series of 30 children, there were 1/30(3%) case of incarceration. But none had strangulation and gonadal infarction. In the post operative period of 30 children, there were 2 cases of wound infection and 1 case had hypoglycemia. No other complications were noted.

Recurrence: During the period of 2 years study and follow up period of 12 weeks to 24 weeks, 1(3%) cases had a recurrence.

Inguinal and Scrotal swellings in children form a majority of surgical conditions requiring treatment. Inguinal hernia repair is the most frequently performed operations in the pediatric age group. The legendary Robert Gross had said “There is nothing as interesting as an inguinal hernia.” In controlled population based studies, there are between 10 and 20 inguinal hernias per 1000 live births[3]. In the present study of 30 cases, the youngest patient was 2 month of age and oldest was 12 years old. 50% of cases were between 2-7 years. According to Okuribido *et al* 47.4% cases were between 3-7 years of age, Adesunkamani AR *et al* 71% cases are below 5 years of age[4]. In all the studies of inguinal hernia in children, there is male preponderance. Female cases were evaluated for inter sex. USG was done to rule out inter sex, we have not found case of inter sex. Childhood inguinal hernias are generally more predominant on the right side and this has been attributed to the delay in descent of the right testis. B/L cases were evaluated for inter sex and connective tissue disorder but were not associated. In Rowe and Grosfeld et al study 55-60% cases presented with right side swelling, 25% cases presented with left side swelling and 15% cases presented with bilateral swelling[5]. In the present study the duration of symptoms, from 1 day to 1 week is seen in 1/30(3%) cases, 1 week to 1 month seen in 2/30(7%) cases, 1

month to 1 year is seen in 13/30 (43%) cases and next from 1 year to 5 years in 11/30 (37%) and more than 5 years duration seen in 3/30(10%) cases. The delay in recognizing the swelling in inguinal region is due to size. Size may be small where patients/parents could not able to pick up or the surgeon is unable to confirm its presence. According to Llyod and Rowe most of the hernias are asymptomatic swelling and acute presentation seen in 12% of children. In our study most of the patients presented with asymptomatic swelling (93%) and acute presentation seen in 2 patients (7%). They presented with acute pain, vomiting, fever, swelling and irreducibility. According the Llyod and Rowe6 the incarceration of inguinal hernia is 17% on right side and 7% on left side with over all rates being 12%. In our study 1/30 case of incarceration seen on the right side with 3% and over all rate being 3% this showed that incarceration is more common on right side. Incidence of incarceration is low in our study this may be due to early diagnosis and most of the surgeons do not hesitate to operate on infants as early as possible due to availability of newer anesthesia and better NICU care. Direct inguinal hernias in children are rare and represent 0.5-1% of all groin hernias. Javad Ghoroubi et al reported 5.85% undescended testis cases[7]. In present study, 2/30(7%) cases of undescended testis were detected, all of them were on the right side and situated in the superficial inguinal pouch. These patients had orchidopexy at the time of hernia repair and testis was placed in the subdartos pouch. Present studyshows9/30(30%) cases associated with hydrocele and correlates well with other studies. Out of 30 cases in this study, association of hypospadias was observed in 1(3%) case. In our study 27 patients with unilateral inguinal hernia underwent US examination. In 27 cases 2 cases (7%) were diagnosed as CPPV. Out 2 cases 1 on right side, 1 on left and all were boys and were within 2 years. Since our study is observational and there is chance of spontaneous closure within 2 year, we have not explored contralateral side and no comparison was done with operative findings. But for these cases regular follow up was done and found that 1 case developed C/L inguinal hernia on right side after 6 months. Hata S., Takahashi[8] studied 348 patients with unilateral inguinal hernia. All underwent US examination using a 7.5 MHz linear transducer and a groin with a hydrocele in the inguinal canal on straining was diagnosed as a CPPV and was explored bilaterally through surgery. The US findings were compared with surgical results. In 348 patients, 78 cases (22.4%) were diagnosed by US as patients with a CPPV., these patients underwent bilateral surgery. Seventy-four of 78 cases (94.9%) were confirmed surgically as patients with CPPV and concluded a CPPV was detected correctly by US in 74 of 348 patients (21.3%) with clinically diagnosed unilateral inguinal hernias. Out of 30 cases 24 cases received GA, 3 cases received caudal (0.25% bupivacaine, 1ml/kg) and 3 cases received spinal anesthesia. Most commonly children were operated under GA. Use of caudal block will have better pain control postoperatively. Recent 'Inguinal Hernia' guidelines of the Association of Surgeon of the Netherlands 95 recommended that the operations be carried out in daycare and that the use of local anesthesia should be considered more often. The diagnosis of inguinal hernia is based on the physical examination. It is recommended that the surgeon should not rely solely on the history but confirm the presence of a hernia personally. The treatment of a pediatric inguinal hernia is always operative. Generally, younger the child, the more urgent the operation, because of the increased risk of incarceration in infants, particularly premature babies. There is no indication for routine exploration of the contra lateral groin. If an incarcerated hernia cannot be reduced, emergency operation is necessary and referral to a pediatric surgical centre must be considered. All incarcerated hernia 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 (1.7 Vs 22.1%). In the present study there were no case of strangulation and gonadal infarction. The less number of complications in this series could be attributed to larger number of elective cases and fewer emergencies that too operated in time. Recent 'Inguinal Hernia' guidelines of the Association of Surgeon of the Netherlands there is no indication for routine C/L exploration[9]. In this study only the side with an obvious hernia was operated. Postoperative analgesics were provided on a routine basis and were consist of either acetaminophen suppositories (10mg/kg every 4 hours for 24 hours, then as needed) or diclofenac suppositories in children <1 year or caudal block. For 27 cases intraoperative rectal suppositories was put at the end of surgery and observed that 90% of cases were comfortable and were not required additional analgesia. For 3 cases caudal block given, it was observed that post operatively patient were comfortable without additional analgesia up to 6 hours after surgery. Use of suppositories have adequate pain control and can be used routinely. Most operations are performed on day care basis and sent on day of surgery. 1 case had inadequate pain control and 1 case had emesis and were kept under observation in the recovery room. In the post operative period of 30 children, there were 2 cases of wound infection and 1 case had hypoglycemia. No other complications were noted. All of them responded to conservative treatment. Carneiro P.M.R.85 had six years retrospective review of 397 herniotomy in 380 children up to the age of 10 years and encountered 16 minor post operative complication. Lawrence R. Moss and

Edwin I. Hatch in a study of 384 patients who under went inguinal hernia repair during a 5 years period found 9 minor post operative complications[10]. During the period of 2 years study and follow up period of 12 weeks to 24 weeks, 1/30(3%) cases had recurrence. Recurrent inguinal hernias are relatively un-common. Reports from most children's document an incidence of 1-2%. The recurrence may be associated with comorbid conditions including increased abdominal pressure, prematurity, malnutrition and anemia and connective tissue disorders. The repair of a child's hernia is not a parlor piece, but a master's work and should be preformed or supervised by a skilled surgeon.

CONCLUSION

Inguinal hernia and hydrocele in children remain one of the most common congenital anomaly observed by surgeons. The threat to loss of testis, ovary or a portion of bowel due to incarceration or strangulation remains. Prompt diagnosis and early treatment of the inguinal hernia continues to be the mainstay if these complications are to be avoided. Regarding the sex prevalence, males are more commonly affected. Congenital anomalies like undescended testis and hypospadias can be associated with inguinal hernia and hydrocele. In the case of undescended testis, orchiopexy should be done at the time of hernia repair. Parents are usually the first person to notice the swelling or bulge. USG is a good alternative tool for diagnosing CPPV. An inguinal hernia will not resolve spontaneously and should be repaired as soon as possible after the diagnosis because of the risk of incarceration or strangulation. In general, infants and children require general anesthesia for the operative repair of inguinal hernia and hydrocele. Post operative complications are usually rare following elective operation whereas minor complications do occur after emergency operation. There was no disabling or prolonged morbidity related to the common operative procedure. Recurrence is usually rare if operated by experienced surgeons but it can occur. Inguinal herniotomy in children is a safe and effective operation done as Day care procedure but risk of hypoglycemic shock has to be kept in mind which can be a grave consequence of Day care surgery.

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