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ORIGINAL ARTICLE

OUTCOMES OF INFRA UMBALICAL LAPAROTOMY APPROACH VS CONVENTIONAL INGUINAL APPROACH IN THE MANAGEMENT OF IRREDUCIBLE INGUINAL HERNIAS IN CHILDREN: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: Inguinal hernias that turn out to be complicated with irreducibility and obstruction can cause danger to the life of the child and add to morbidity. This study aims to investigate the outcomes of the infra-umbilical transverse laparotomy incision approach compared to the conventional inguinal approach in the management of irreducible inguinal hernias in children, with a focus on postoperative complications, recurrence rates, length of hospital stay, and cosmetic results.

Materials & Methods: This randomized controlled trial was conducted in department of pediatric surgery, children hospital Lahore from Jan 2022 to Jul 2023 after IRB approval. Eighty four patients with irreducible inguinal hernia were selected and enrolled in this study. Patients were divided randomly into two groups; Group-A (operated via conventional inguinal approach) and Group-B (via infra umbilical laparotomy approach), 42 in each group. Post-operative complications, ease of procedure, and outcomes were compared between these two groups. All the Data were entered in SPSS 24. An independent simple t-test was used for comparison of variables.

Results: Forty two patients presenting with irreducible inguinal hernias to the emergency department in each group were compared, With over all 94% being male and 6% female. Mean age of patients was 12.09 ± 11.35 months. Mean duration of symptoms prior to presentation was 29.07 ±6.53 hours. Following surgery through conventional inguinal approach, 9.5 % experienced scrotal swelling, 5.3% experienced recurrence,4.2 % had bowel injury during dissection, 2.50% had injury to vas deferens 1.5% had iatrogenic undescended testis and 2.5% mortality rate. While patients operated via infra umbilical laparotomy approach has only complication of wound infections 3.4% with no other complications encountered as compared to conventional inguinal approach. Post-operative complications were significantly less in infra umbilical laparotomy approach.

Conclusion: The current study concluded that post-operative complications were less with infra umbilical laparotomy approach as compared to conventional inguinal approach. Infra umbilical approach should be adopted in cases of irreducible, obstructed and strangulated inguinal hernia for better outcomes.

KEY WORDS: Inguinal Hernias; Infra Umbilical Laparotomy; Post op complications.

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INTRODUCTION

Inguinal hernia is a most common surgical disease found in children.[1] Generally occurrence of indirect inguinal hernias ranges from 0.8% to 5% in full-term infants, however, the risk is considerably higher in the infants with low birth weight (<1kg) or in premature cases. Inguinal hernias are more frequent in boys as compare to girls (5:1).(1) Many children may have asymptomatic inguinal hernia; however the treatment is always surgical repair. One of the

most important complications of inguinal hernia is irreducibility with prevalence from 3% to 16%, with the peak occurrence expected to be 30% in premature children.[2] Incarceration occurs due to irreducibility of hernia contents, generally bowel loops, omentum, fallopian tube and ovaries. This may advance to frank intestinal obstruction and following strangulation. It is due to entrapment of blood supply to the testis via the testicular artery and or bowel section through the mesentery causes ischemia and later, testicular infarction or bowel gangrene.[3]

The conventional inguinal approach has been the standard method for surgical repair of irreducible hernia, but it is associated with certain limitations, including the potential for injury to vital structures, limited visualization of gut and wound-related complications.[4,5] In our unit, there has been growing interest in the infra-umbilical transverse laparotomy incision as an alternate method for the surgical repair of irreducible inguinal hernias in children considering better visualization as well as approach to intra-abdominal contents and lesser post operative complications. Unfortunately no such study was conducted in local set up previously so this study has been conducted to fill this gap.

MATERIALS AND METHODS

We conducted a randomized controlled trial of 84 children presented and operated for irreducible inguinal hernia from Jan 2022 to Jul 2023 in the pediatric surgery department children hospital Lahore according to inclusion and exclusion criteria. Both male and female patients with irreducible, obstructed and strangulated inguinal hernia were included while a patient whose hernia got reduced manually; those with recurrent inguinal hernia, acute scrotum were excluded. The detailed data including demographic details, clinical presentation, investigations performed, management provided, complications encountered and over all outcome were entered and analyzed.

An inguinal hernia is thought to be irreducible as the contents unable to go back into the peritoneal cavity without an intervention. The patients with irreducibility but without features of incarceration and strangulation were offered manual reduction of the hernia using analgesia and sedation (intravenous diazepam) and were not included in the study. Those that were not entitled for manual reduction were ready for an immediate surgery and were included in the study. Patients were randomized into two groups on basis of management approach via lottery method. Patients in group A were operated through conventional inguinal approach while patients in group B were operated through infra umbilical laparotomy approach. Elimination criteria for manual reduction incorporated persistent vomiting, constipation, fever and abdominal distension. All the parameters including gender, the therapeutic management approach, and the evolution were studied. The information obtained was entered into a computer using SPSS version 23 software and data analysis performed. Quantitative variables like age, weight were presented in forms of mean. Qualitative variables like gender are presented in the form of frequencies and percentages. An independent t-test was used for the comparison of outcome variable. A p-value less then0.05 was considered statistically significant.

RESULTS

Total of 84 patients with irreducible inguinal hernias were received in the emergency department, with 79patients (94%) male and 5patients (6%) female. Over all male to female ratio was 15:1.The mean age of the patients was 12.09 ± 11.35 months. Right side was most affected with fifty six patients (63.1%), twenty patients (25.4%) having left inguinal hernia and 8patients (11.5%) presented with bilateral inguinal hernias. Mean duration of symptoms prior to presentation was 29.07 ±6.53 hours.

The most common presentation encountered was irreducible groin swelling, which was associated by abdominal distention, vomiting (7.2%).Out of these, 51.1 %(n-48) of the patients had irreducible inguinal hernias, 38.1.% (n-32) had obstructed hernias, and 4.8 %(n-4) had strangulated inguinal hernias.

Regarding treatment 50% (n-42) of the patient were operated via inguinal approach while 50% (n- 42) patients were operated infra umbilical exploratory laparotomy approach. The small bowel was the most common viscera involved in the hernia sac (53.6%) followed by the large bowel (20.2%) and Amyand's hernia (8.3 %).The involved gut was predominantly healthy 84.5 %(n-71), with just 15.5% (n-13)of patients in which gut was not viable requiring resection and ETE anastomosis. Following surgery, 9.5 % experienced scrotal swelling, 5.3% experienced recurrence, 4.2 % had bowel injury during dissection, 2.50% had injury to vas deferens 1.5% had iatrogenic undescended testis and 2.5% mortality rate. While patients operated via infra umbilical laparotomy approach has only complication of wound infection 3.4%. On analysis of outcome variables, post operative complications were significant less in Group-B (infra umbilical approach) as compared to Group-A (conventional inguinal approach) with a p-value less than 0.05.

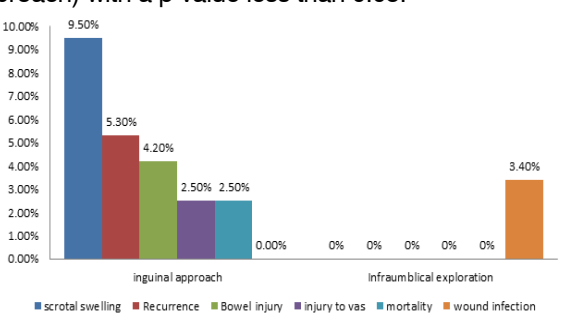

Fig 1. Bar chart showing comparison between management approaches

Table 1: Showing comparison of demographic and outcome variables

S. No.	Variable	Inguinal approach	Infra umbilical laparotomy approach	P-value
1	Mean Age (months) ±SD	13.09±12.35	14.1±11.32	0.110
2	Gender ratio(M/F)	13:1	18:1	0.431
3	Duration of irreducibility(hours)	18.07 ±12.7	12.30 ±9.20	0.345
4	Total hospital stay(days)	3.62 ±4.72	4.25 ±5.01	0.546
5	Post op complications (Yes / No)	21.90 ± 7.48	14 ± 6.39	0.001

DISCUSSION

Inguinal hernia is common in children, particularly among males, with a male to female ratio of 15:1 as reported in our study and the literature.[4] Inguinal hernia doesn't resolve on its own and requires timely surgery due to the risk of incarceration.[7] However, in some countries, cases often present late with features of obstruction, peritonitis, and deterioration in the patient's general condition. This delay in treatment can be attributed to several factors, including late presentation to the hospital, delays in referral by local practitioners, parental reluctance to have surgery performed on young children, lack of skilled personnel capable of providing anesthesia to neonates, financial constraints faced by the families.[1]

Irreducibility and incarceration are more common in children less than 1 year age. When hernia reaches a state of irreducibility and obstruction, it is associated with an increased rate of morbidity and mortality. Incarceration of an indirect inguinal hernia and its complications can be prevented through early herniotomy after diagnosis, without delay. Therefore, it is crucial to repair or treat inguinal hernias as soon as they are diagnosed to prevent such complications. In cases of irreducible, obstructed, and strangulated inguinal hernias, the edema of the inguinal canal can pose challenges during surgery and lead to significant post-operative complications, especially in instances of delayed presentation.

Aboagy et al. reported that 56% of patients with inguinal hernia would have developed incarceration earlier to their first birthday. In our study two thirds of the patients with irreducible hernia were infants and 61% had incarceration before the age of one year. Thus our results viewing more probability of incarceration before one year of age which almost coincides with that reported in literature.[5] Thus, early repair of inguinal hernia has been advocated when discovered immediately after birth. Unluckily, to a certain extent a number of children are delivered in remote hospital settings in developing countries. Public health education and explanation may therefore be essential for traditional birth attendants, midwives and others that are apprehensive in their deliveries in developing countries towards early recognition and prompt referral.[6]

During surgery, the hernia contents were found to be small bowel in 45 patients, large bowel in 17 patients, appendix in 7 patients, ovary plus fallopian tube in 4 patients and omentum in 11 patients which were healthy, and were reduced and definitive procedure performed. 8 cases with more than 36 hours of incarceration had gangrenous bowel which was resected and anastomosis was done. This concluded that the probability of strangulation in pediatric hernia increases with longer the duration of incarceration as reported in literature.[7.]

Regarding post op complications, scrotal swelling was observed in 9.50% population operated via conventional inguinal approach while none of the patient had scrotal swelling operated via infra umbilical approach. Similarly5.30% population had recurrence of the inguinal hernia, 4.2% had bowel injury, 2.50% had injury to vas deferens while dissection, 2.50% had mortality when operated through conventional approach.While none of the patient had above complications when infra umbilical laparotomy approach was used. Only 3.40% had wound infection encountered when infra umbilical laparotomy was done. These results showed that conventional inguinal approach faced many complications as compared to infra umbilical approach. Infra umbilical exploration for irreducible, obstructed and strangulated inguinal hernia is more beneficial in terms of less post operative complications, ease of procedure, and examination of the trapped gut with less chance of injury to bowel during reduction.

CONCLUSION

Infra umbilical exploration is more beneficial in terms of ease of procedure, examination of the trapped gut with lesser complications. We conclude that infra umbilical exploration should be adopted for irreducible, obstructed and strangulated inguinal hernia for better outcomes.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	MR, MSS
Acquisition, Analysis or Interpretation of Data:	MR, MSS, JA, KS, AK, MI
Manuscript Writing & Approval:	MR, MSS, JA, KS, AK, MI

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.