

Laparoscopic Needle assisted Repair of Inguinal Hernia in Children in Manipal Teaching Hospital, Pokhara.

Binod Bade Shrestha¹, Sujan Shrestha²

¹ Assistant Professor, Department of Surgery, Manipal College of Medical Sciences, Pokhara, Nepal

² Mch Resident, Gastroscopy, Department of Surgery, Tribhuvan University Teaching Hospital, Maharajgunj, Nepal.

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ABSTRACT

Introduction: There are numerous minimally invasive surgical techniques for repair of congenital inguinal hernia (CIH) in children. We present a unique needle-assisted laparoscopic inguinal hernia repair using 20-gauge intravenous cannula. This study aims to evaluate the safety and feasibility of this technique.

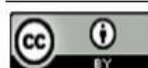
Methods: This prospective descriptive study was conducted in 50 patients; aged 1-13 years; from February 2018 to May 2019; either admitted with the diagnosis of CIH or detected incidentally when operated for some other surgical conditions. CIH was repaired using single supraumbilical port and 2-0 prolene suture passed through 20-gauge intravenous cannula. Statistical analysis was done using SPSS 20.

Results: A total of 56 hernias were repaired in 50 patients out of which five cases were detected incidentally on patients undergoing laparoscopic appendectomy. The bilateral CIH was present in six cases. The mean operative time was 18.20 ± 4.57 minutes; 17.36 ± 3.83 minutes for unilateral hernia and 24.33 ± 5.20 minutes for bilateral hernia. There was no difference in operative time when compared between gender ($p=0.26$). The complications were recurrence in 1 (1.78%) case, hematoma around deep ring in 2 (3.57%) cases and puncture site bleeding in 2 (3.57%) cases. There were 35 (70%) male and 15 (30%) female. The contralateral occult hernias were noted in 5 (10%) cases.

Conclusions: Single port laparoscopic repair of inguinal hernia using a 20-gauge intravenous cannula with non-absorbable suture is a safe, effective and feasible in resource poor settings. The postoperative complications are minimal which is similar to past studies.

Key words: *Hernia; Inguinal; Laparoscopic; Needle assisted.*

Correspondence: Dr. Binod Bade Shrestha, Department of Surgery, Manipal College of Medical Sciences, Phulbari -11, Pokhara, Nepal. Email:badebinod@gmail.com



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INTRODUCTION

Congenital inguinal hernias (CIH) is a common pediatric surgical condition.[1] A patent processus vaginalis (PPV) leads to development of CIH. The prevalence of PPV is as high as 80% in term male infants.[2] The incidence of inguinal hernia from birth to 15 years is 6.62 and 0.74 % in males and females, respectively.[3]

With the advancement in minimal invasive surgery, there has been growing interest in laparoscopic repair of CIH. There are various techniques of repairing CIH. Here we present needle assisted; 20- gauge intravenous cannula; ligation of internal ring in children which is easy, feasible in resource poor settings with good post-operative outcomes.

This study aims to evaluate the safety and feasibility of laparoscopic needle assisted repair of CIH.

METHODS

This prospective descriptive study was conducted in 50 patients; aged 1-13 years; either admitted with the diagnosis of Congenital inguinal hernia (CIH) or incidental finding of CIH operated for some other surgical conditions. This study was conducted in Department of Surgery of Manipal Teaching Hospital, Pokhara, Nepal from February 2018 to May 2019 after obtaining approval from the institutional review board. The written and informed consent was taken from the parents. Huge CIH, recurrent, incarcerated, strangulated hernia and parent's refusal to participate in the study were excluded from the study.

The sample size was calculated using following formula:

$$n = z^2 \times (p \times q) / d^2 \quad \text{where,}$$

n = sample size, p = prevalence (i.e. 6.62%), q = 1-p,
d = margin of error 7%, z = 1.96 at 95% CI

$$\text{From the calculation; } n = 1.96^2 \times (0.06 \times 0.94) / 0.07^2 = 44$$

The total of 50 patients were enrolled in the study.

Surgical Technique: All the cases were done under general anesthesia with endotracheal intubation and muscle relaxation in supine position. The carbopertoneum was created and maintained at a pressure of 6-8 mmHg. The patients were then placed in Trendelenburg position. Due to unavailability of 5 mm telescope, 10 mm supraumbilical trocar with 30° 10 mm telescope was used to examine the abdominal cavity and pelvis. The internal ring was visualized and defined externally by finger indentation. A 20-gauge intravenous cannula loaded with prolene 2-0 suture folded at its tip was inserted at this site. It formed the loop at the inferior edge of the internal inguinal ring (IIR) covering its one half. The cannula was withdrawn leaving behind the loop and re-inserted through the previous puncture site. Then, second prolene 2-0 suture was passed through it. It covered the remaining half of IIR. The tip of this suture was placed inside the first loop that was created. The previous loop suture and the second suture is pulled outwards thus completely encircling the IIR. A tight knot was applied subcutaneously to occlude the defect. The 10 mm port site defect was opposed with port Vicryl and skin was stapled.

Operative time was calculated from the time of incision in supraumbilical port to last staple applied.

Age, gender, side of repair, surgical technique, mean operative time, intra-operative and post-operative complications as recurrence rate, hydrocele formation, suture abscess/granuloma, testicular atrophy were evaluated. All patients were discharged the next day of operation and minimum of 2 months of postoperative follow up was done.

Statistical analysis was done using SPSS 20. The quantitative data were expressed as mean \pm sd or number/ percentages. The categorical variables were evaluated using chi square. P

value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 56 hernias were repaired in 50 patients out of which five cases were detected incidentally on patients undergoing laparoscopic appendectomy.

The mean operative time was 18.20 ± 4.57 minutes; 17.36 ± 3.83 minutes for unilateral hernia and 24.33 ± 5.20 minutes for bilateral hernia. There was no difference in the operative time when compared between the genders Table 1.

Table 1. Operative time

Gender	Mean \pm SD	P value
Male	18.40 ± 3.91	0.26
Female	17.73 ± 5.97	

The major complications like recurrence was seen in 1(1.78%) case and hematoma in 2 (3.57%) cases around deep ring.

The minor complications like puncture site bleeding was seen in 2 (3.57%) cases.

Surgical site infection, testicular atrophy, hydrocele and suture abscess/ granuloma was not seen in any cases.

None of the cases were converted to open technique.

The demographic variables are presented in Table 2.

Table 2. Demographic variables

Variables	Number of patients
Male	35 (70%)
Female	15 (30%)
Right congenital hernia	32 (64%)
Left congenital hernia	12 (24%)
Bilateral congenital hernia	6 (12%)
Occult hernia	5 (10%)

DISCUSSION

The Ferguson/ open hernia repair is considered as a gold standard treatment for repair of inguinal hernia in children. Over the past two decades, laparoscopy has advanced and multiple techniques for inguinal hernia repair have been established. It started with the use of three

ports which narrowed down to single port using of various devices.[4-6] Ozdegiz et al. in 2005 first reported repair of CIH using single port using Tuohy needle to accomplish the encirclage.[4] In this study, the same was achieved without the use of any such additional devices. In our study, out of 45 cases, 43 cases were repaired using single port and a 20-gauge intravenous cannula which is easily available and cheap. Remaining two cases required additional three mm port due to presence of irreducible omentocoele in one and the femoral hernia in other.

One of the advantages of laparoscopic repair of congenital inguinal hernia (CIH) is easy detection of contra-lateral occult hernias thus preventing the future occurrence. Persistent processus vaginalis (PPV) is responsible for most of the occult hernias; the prevalence of which is 23-37%.[7] In our study it was 10%. This low rate is probably because we conducted the study in children aged one year and above whereas the incidence of PPV is highest in the first year of life. We repaired only those occult hernias whose length was more than 2 mm and sac was more than 1.5 cm which is as per the guideline.[4,6]

The mean operative time for unilateral and bilateral repair in our study was 17 and 24 minutes respectively which is similar to that of Ferdous et al 21.2 and 30.3 minutes and Kumar et al 13 and 20 minutes for unilateral and bilateral repair respectively.[8,9] Even though a keen attention is needed for vas in case of male while encircling the ring there was no significant difference in operative time between the genders. The male predominance of CIH was noted in our study which is similar to past studies Kumar et al.[9]

The recurrence rate in our study was 1.78% which is similar to Ferdous et al 1.98% and Patkowski et al 2.1%.[8,10] The recurrence was seen in a female child in whom we had tried to encircle the internal ring twice. She underwent open herniotomy after few days. On herniotomy, we noticed the cut on suture which might have been cut by tip of cannula on second attempt of encircling the ring.

Puncture site bleeding in our study was 3.57%. This result is also in equivalent to Ferdous et al 2.97%.[8] Bleeding was controlled by applying pressure.

CONCLUSION

Single port laparoscopic repair of inguinal hernia using a 20-gauge intravenous cannula with non-absorbable suture is a safe, effective and feasible in resource poor settings. The postoperative complications are minimal which is similar to past studies.

CONFLICT OF INTEREST

None

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None

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