



## Laparoscopy Assisted Single Port Needlescopic Repair of Pediatric Umbilical Hernia – A Case Report and Review of Literature

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### ABSTRACT

**Background:** Majority of the asymptomatic umbilical hernia resolve spontaneously by the end of fourth year of life and requires surgical intervention if it does not resolve beyond this age. Surgical intervention is also advocated in literature for obstructed, incarcerated, or strangulated umbilical hernia. **Methods:** We managed a child aged eighteen months who presented to us as a symptomatic umbilical hernia sized 1.5 centimeters having history of frequent irreducibility by a novel technique involving laparoscopy assisted single port needlescopic repair using a peripheral intravenous catheter needle. The peritoneal access for pneumoperitoneum was achieved at Palmer's point. **Results:** The total operating time was 18 minutes; post-operative hospital stay was one day and no recurrence on follow up. **Conclusion:** Laparoscopy assisted single port needlescopic repair of symptomatic umbilical hernias in children is a novel and safe technique but it requires studies with larger number of patients for it to become a standard procedure.

**Keywords:** Laparoscopy, single port, needlescopic repair, umbilical hernia, child.

### INTRODUCTION

Majority of the umbilical hernias in children resolve spontaneously by the fourth year of life. A failure or delay in fusion of peritoneal and fascial layers or decreased growth of abdominal musculature at the umbilical ring leads to the formation of an umbilical hernia. These are mostly asymptomatic but occasionally get complicated by becoming irreducible and sometimes get incarcerated or strangulated necessitating surgical intervention as an emergency procedure. Umbilical hernias need surgical intervention as an elective surgical intervention mostly for its persistence beyond the age of spontaneous closure [1] but at times it is done for children having history of repeated irreducibility with

spontaneous reduction or if the child belongs to a very remote area of a developing nation where access to health care facilities is difficult. The preferred approach for surgical intervention has been by open method [2] with very few studies conducted for minimal invasive methods and none with needlescopic approach using peripheral intravenous catheter (PIVC) needle. [3, 4]

### CASE REPORT:

An eighteen-month-old child belonging to a very remote area in northern India presented to the casualty of our tertiary care institute with history of excessive crying and refusal to feeds. The parents

gave history of swelling at the umbilicus of the child since birth which used to increase and decrease in size on crying but had become irreducible for the past few hours. There was history of the similar episode of irreducibility 6 months back which was managed conservatively at a peripheral health institute and was advised wait for spontaneous resolution and watch for warning signs. There was no history of vomiting, constipation or abdominal distension. On examination the child was irritable, crying in between, and hemodynamically stable. There was a soft to firm 2 x 2 centimeters (cms) swelling at the umbilicus having variegated consistency, not tender to touch, irreducible. Ultrasound (US) of the abdomen revealed content as omentum. The child was put on conservative management with intravenous fluid and nasogastric suction. The child was given broad-spectrum antibiotics and injection paracetamol as analgesic. The swelling got reduced with minimal effort once the child became calm. Repeat US abdomen showed a defect of 1.5 centimeters (cms) at the umbilical ring. Keeping in view the history of repeated irreducibility and child belonging to a very remote area it was planned to perform surgical intervention in the same sitting before discharge. The child underwent laparoscopy assisted Needlescopic repair under general anesthesia. After induction and intubation with endotracheal tube child was put in supine position followed by sterile painting and draping. The pneumoperitoneum up to pressure of 8 mm of mercury (Hg) was created using pediatric veress needle and carbon dioxide (CO<sub>2</sub>) via Palmer's point (figure 1a). Thereafter 5-mm (millimeters) port for 30 degrees 5-mm telescope was placed through the same Palmer's point and intra-abdominal surfing was done. A defect of approximately 1.5 cms was visualized at the umbilicus with no contents (figure 1b). A 5-mm length supra-umbilical incision was made (figure 1c). Using PIVC needle (INTRA CATH®-2, Romsons® 2460, Agra, INDIA, sized 16-gauge, outer diameter 1.72 mm, length 45 mm) peritoneal cavity was accessed via the supra-umbilical incision at points 3-4 mm from the superior and inferior margins of the defect at midway and the tip of the PIVC needle taken out percutaneously at an infra-umbilical location. (Figure 1d) Polypropylene 2-0 was negotiated through the hollow of the PIVC needle and the needle was removed keeping the

polypropylene thread across the defect (figure 2a). Again, the same PIVC needle was negotiated from the same spot in the supra-umbilical incision across the defect but this time through the subcutaneous plane (figure 2b). Next the end of the same polypropylene thread was negotiated through the hollow of the needle from the tip to be brought out from the hub end of the needle at supra-umbilical position thus completing the suture loop across both the edges of the defect. (Figure 2b) Similarly, 2 more sutures were taken across the defect 4-5 mm apart from the central suture. Before tying the knots, the placement of sutures was checked via intra-abdominal view. (Figure 2c) After desufflation the knots were tied and placed subcutaneously thus closing the defect. The abdominal incision sites were closed using 4-0 synthetic non-absorbable monofilament sutures. (Figure 2d) Oral feed was started 6 hours post operatively and the child was discharged the next day in a stable condition. Abdominal stitches were removed on 1<sup>st</sup> week follow up visit. There were no post-operative complications or recurrence noted during 16 months follows up. All procedures performed involving human participants or on human tissue were in accordance with the ethical standards of the institution. Informed written consent was obtained from the parents of the child.

## DISCUSSION:

Umbilical hernias affect almost 10-30 % of all children at birth, decreasing to 2-10% at one year of age, with boys and girls affected equally. Majority of the umbilical hernias in small children are asymptomatic but at times may present with abdominal pain, nausea, vomiting, abdominal tenderness, distension and skin erythema pointing towards possible complication like obstruction, incarceration or strangulation. The overall risk of incarceration though low is estimated to be 0.07-0.3% and merits urgent surgical intervention. [5] Strapping the umbilicus was a popular technique during the middle of the last century became obsolete few decades back but has again been revisited and approved. [6] But subjecting a child with recurrent history of irreducibility to such modes of management is not advisable. Most of the umbilical ring defects in children close spontaneously within 2 years. A defect of 1.5 cm or more in children over the age of 2 years was once considered as useful indicator for open surgical intervention during the

later part of the previous century because of minimal chance of spontaneous closure. [7] But a recent study involving vast number of cases stressed on the fact that majority of incarceration occurred in defects with smaller size. [8] Therefore active observation of all umbilical hernias at all ages will ensure early detection of complications and prompt treatment.

With the advent of laparoscopic procedures in adults and their successful outcomes during the last 2 decades of twentieth century, the pediatric surgeons too ventured into the field of laparoscopy though with caution. During the late last decade of the twentieth and early years of twenty-first century only few centers around the globe started performing laparoscopic pediatric procedures for few selected conditions. Slowly it picked up the pace as with adult laparoscopy. For umbilical hernias, till date very few studies have been conducted mostly being case reports or case series. [2-4] Laparoscopic assisted needlescopic repair of epigastric hernia using spinal needle with telescopic port via umbilicus has been described in literature. [9, 10] After extensive literature search, the authors could not find any article reporting laparoscopy assisted single port needlescopic repair using peripheral intravenous catheter needle for a symptomatic umbilical hernia, shedding light of novelty in our technique as described in the case history and results. A study involving 6 patients described closure of the umbilical hernias using two 3-mm lateral ports for repairing both hernias in children presenting with epigastric hernias associated with umbilical hernias. [3] In our case the access for pneumoperitoneum was achieved via Palmer's point (for adults three cms below the left subcostal margin at midclavicular line; we marked it at 1.5 cms below since it was a pediatric case). The prerequisites for gaining access via Palmer's point are that there should be no splenomegaly and the stomach should be deflated via the nasogastric tube. A single 5-mm port for 5-mm 30-degree telescope, one peripheral intravenous cannula needle sized 16 and one 2-0 polypropylene suture were required to complete the procedure. There were no post-operative complications noted and the operating time was 18 minutes making it a quick, easy and safe procedure.

**CONCLUSION:** Repeated irreducibility and doubtful access to health care system should be taken into consideration for early surgical intervention and

should guide as factors to abandon expectant management for the umbilical hernia in children. Laparoscopy assisted single port needlescopic repair using peripheral intravenous catheter needle is safe and effective procedure. Peritoneal access in small children can be achieved via Palmer's point safely.

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**DECLARATIONS:**

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**REFERENCES:**

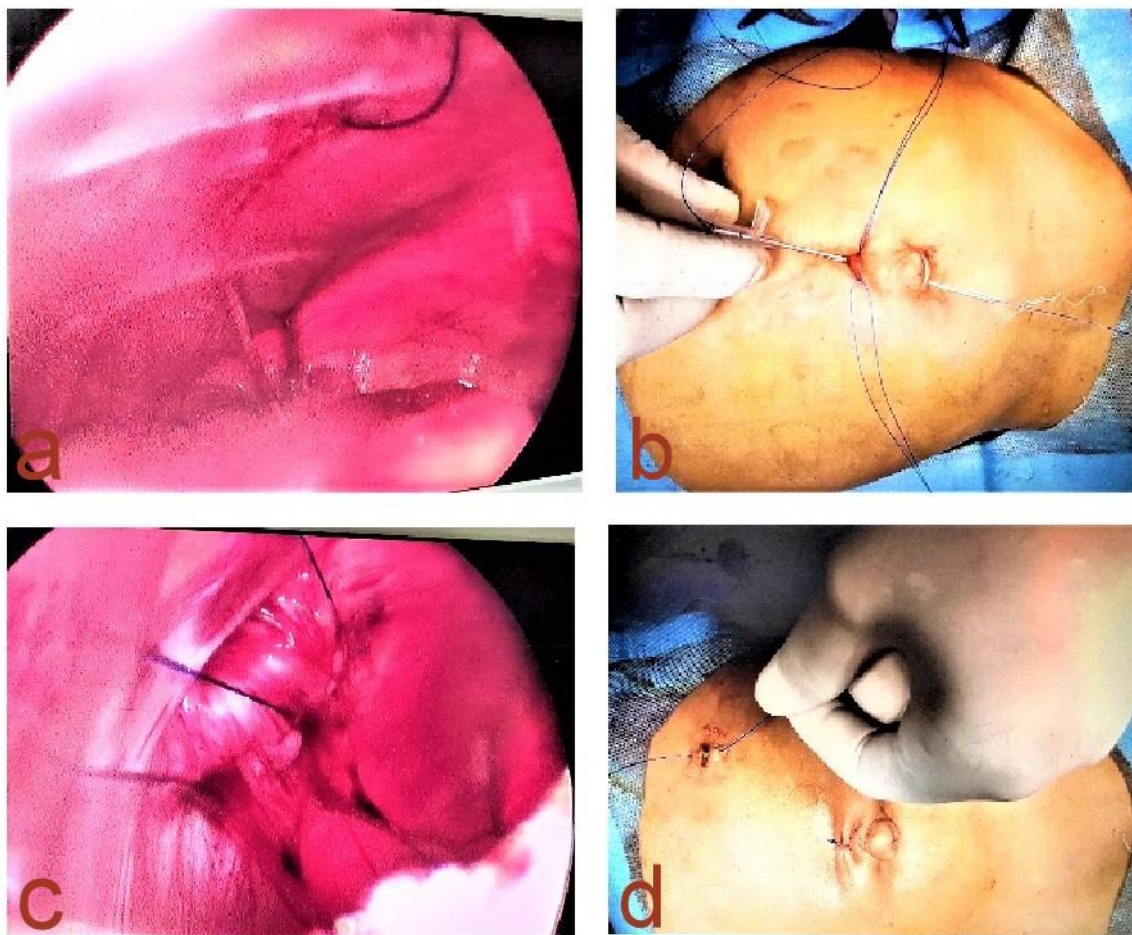
1. Densler JF. Umbilical hernia in infants and children. J Natl Med Assoc. 1977; 69(12): 897.
2. Bowling K, Hart N, Cox P, Srinivas G. Management of paediatric hernia. BMJ. 2017; 359: j4484.
3. Craig T Albanese, Shawn Rengal, Dustin Barmudez. A novel laparoscopic technique for pediatric umbilical and epigastric hernias. Journal of Pediatric Surgery 2006; Volume 41 (4): 859-62.
4. M Bartozzi, E Magrini, A Appignani. Preliminary experience with laparoscopic repair of associated inguinal and umbilical hernias in children. Hernia 2015; 19 (4): 617-21.
5. Abdulhai SA, Glenn IC, Ponsky TA. Incarcerated Pediatric Hernias. Surg Clin North Am. 2017; 97(1): 129-145.
6. Yanagisawa S, Kato M, Oshio T, Morikawa Y. Reappraisal of adhesive strapping as treatment for infantile



- umbilical hernia. *Pediatr Int.* 2016; 58(5): 363-8.
7. Walker SH. The natural history of umbilical hernia. A six-year follow up of 314 Negro children with this defect. *Clin Pediatr (Phila)*. 1967; 6(1): 29-32.
  8. Zendejas B, Kuchena A, Onkendi EO, Lohse CM, Moir CR, Ishitani MB, Potter DD, Farley DR, Zarroug AE. Fifty-three-year experience with pediatric umbilical hernia repairs. *J Pediatr Surg.* 2011; 46(11): 2151-6.
  9. Babsail AA, Abelson JS, Liska D, Muensterer OJ. Single-incision pediatric endosurgical epigastric hernia repair. *Hernia.* 2014; 18(3): 357-60.
  10. Tatekawa Y, Yamanaka H, Hasegawa T. Single-port laparoscopic repair of an epigastric hernia using an epidural needle. *Int J Surg Case Rep.* 2013; 4(3): 262-4.



**Figure 1a-1d:** showing peritoneal access, intra-operative view of umbilical defect, looping of Polypropylene suture around the defect using PIVC 16-gauge needle.



**Figure 2a-2d:** Intraoperative view of Polypropylene suture looping across the defect, three such suture loops taken via the similar technique, intra-operative view of approximation of defect by tightening the sutures just before de-sufflation and subcutaneous knotting, port site being closed at Palmer's point.