

Treatment for incarcerated indirect hernia with “Cross-Internal Ring” inguinal oblique incision in children

Xue-Qiang Yan*, Jun Yang*, Nan-Nan Zheng, Hou-Fang Kuang, Xu-Fei Duan, Hong-Qiang Bian

Department of Pediatric Surgery, Tongji Medical College, Wuhan Children's Hospital, Huazhong University of Science and Technology, Wuhan 430016, China

*These authors contributed equally to this work

Background: This study aims to evaluate the utility of the “Cross-Internal Ring” inguinal oblique incision for the surgical treatment of incarcerated indirect hernia (IIH) complicated with severe abdominal distension. **Materials and Methods:** Patients of IIH complicated with severe abdominal distension were reviewed retrospectively. All patients received operation through the “Cross-Internal Ring” inguinal oblique incision. **Results:** There were totally 13 patients were included, male to female ratio was 9-4. The time for patients to resume oral feeding varying from 2 to 5 days after operation, no complications include delayed intestinal perforation, intra-abdominal abscess, and incision infection happened. Average postoperative hospital stay was 5.2 days. All cases were followed up for 6–18 months. No recurrence or iatrogenic cryptorchidism happened. **Conclusion:** “Cross-Internal Ring” inguinal oblique incision is a simple, safe, and reliable surgical method to treat pediatric IIH complicated with severe abdominal distension.

Key words: Children, incarcerated inguinal hernia, incision, internal ring, perforation, severe abdominal distension

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INTRODUCTION

Incarcerated indirect hernia (IIH) is a common emergent situation in pediatric patients. In this study, a “cross-internal ring” inguinal oblique incision was introduced to treat IIH complicated with severe abdominal distension.

MATERIALS AND METHODS

Clinical characteristics

From January 2014 to December 2014, 13 patients of IIH complicated with severe abdominal distension were admitted in our department, with an average age of 5.8 months (range from 2 to 15 months). The male-to-female ratio was 9-4. According to the disparity of these clinical characteristics, the patients were divided into the four categories:

- Patients had diarrhea (medical history >3 days) recently and presented with severe abdominal distension ($n = 5$)
- Patients who repeatedly represented as incarcerated hernia within 48 h and received several times of manual reduction ($n = 2$)
- Patients gradually progressed into severe abdominal distension after manual reduction and accompanied with fever ($n = 2$)
- Under anesthesia, the contents were automatically restored ($n = 4$).

Anatomical location of the “cross-internal ring” inguinal oblique incision: At the midpoint of the line that connects pubic tubercle and anterior superior spine, an obvious constriction ring can be touched at the internal ring level, and then an oblique incision is taken along the inguinal canal. Toward the head side, the incision is extend 2 cm upward to open the peritoneum layer-by-layer, and toward the foot side,

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Address for correspondence: Dr. Nan-nan Zheng, Tongji Medical College, Wuhan Children's Hospital, Huazhong University of Science and Technology, Wuhan 430016 China. E-mail: 251843326@qq.com

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the incision is extend 1 cm downward to open the inguinal canal [Figure 1].

RESULTS

Intestinal perforation was found in one patient of C category, who presented with fever and abdominal muscle tension on the 2nd day after manual reduction, turbid effusion within the hernia sac, and perforation was confirmed during exploration, which was ascribed to a sunflower seed. Necrosis of the intestine was found in another patient in category D, the effusion within the hernia sac was clear, but spotty necrosis of the intestine was confirmed during the exploration. Mesenteric hematoma was found in six patients, poor blood supply of intestine was noticed in five patients, and all restored well after the reduction. All patients discharged a large amount of loose and liquid stools after decompression of small intestine. All cases were followed up for 12–24 months, no iatrogenic cryptorchidism or relapse was found.

DISCUSSION

Conventionally, when abdominal cavity exploration is required, we usually directly lengthen the inguinal

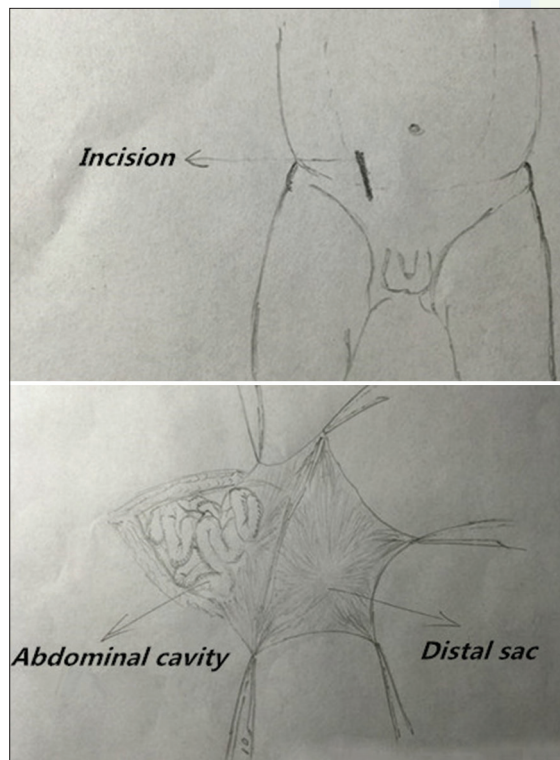


Figure 1: Incision localization. At the midpoint of the line that connects pubic tubercle and anterior superior spine, an oblique incision is taken along the inguinal canal. Towards the head side, the incision is extend 2cm upward to open the peritoneum layer by layer, and towards the foot side, the incision is extend 1cm downward to open the inguinal canal.

oblique incision upward; the total length of the incision is obviously longer than the "cross-internal ring" incision. In addition, using "cross-internal ring" inguinal oblique incision, extraperitoneal high ligation of hernia sac can be achieved at the internal ring level, and there is no need to separate the hernial sac, and thus the risk of seminiferous duct and spermatic vessel damage is reduced. Moreover, "Cross-internal ring" inguinal oblique incision is parallel to the direction of inguinal canal, the peritoneum can be directly opened at the place far away from constriction ring, and we can release the constriction ring under direct vision without causing damages to the incarcerated intestine. Finally, the incision can extend along the longitudinal direction without expanding the skin incision, which guarantees roomy visual field for exploration.

To avoid seminiferous duct and spermatic vessel damages when separating the hernia sac in traditional ways, literatures reported^[1,2] treatment for incarcerated indirect inguinal hernia through transperitoneal closure of the internal ring in 1995. A transverse incision 2 cm above the internal ring is adopted to enter the abdomen, and the hernial sac neck is sutured and closed at the internal ring level, without extraperitoneal separation. However, the position of this incision is relatively high, which will not only impair the appearance but also have difficulties in handling undescended testicle.^[3]

For the purpose of obtaining better visual field and offering convenience for abdominal cavity operation, literatures have reported treatment for IHH through preperitoneal approach^[3,4] and Pfannenstiel incision.^[5] Both of them adopt Pfannenstiel incision, which is relatively lower and more beautiful than that of transperitoneal closure of the internal ring. The peritoneum is separated and opened till the internal ring level. The hernial content is examined and restored under direct vision, seminiferous duct and spermatic vessel are evaded at hernia sac neck, and the internal ring is sutured and closed without extraperitoneal separation. When patient is complicated with severe abdominal distension, all these three approaches can explore the abdominal cavity and thoroughly reduce the pressure of the dilated bowel. Compared with "cross-internal ring" inguinal oblique incision, Pfannenstiel incision has a better cosmetic result, but it does not expose the inguinal canal along the direction of inguinal canal. Therefore, operation is relatively difficult when opening the anterior wall of inguinal canal and looking for the internal ring and hernia sac. Especially under the condition that incarcerated intestine cannot be restored, damage may be caused to the adjacent bowel. While with the

"cross-internal ring" inguinal oblique incision, this risk can be avoided.

CONCLUSION

Incarcerated inguinal hernia complicated with severe abdominal distension is a special type of IIIH in children; our treatment has yielded impressive outcomes. We recommend it as an alternative way to treat pediatric IIIH, especially for those patients who have indications.

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Conflicts of interest
There are no conflicts of interest.

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