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Non-ligation of the hernial sac during herniotomy: a prospective study

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Abstract Herniotomy is performed for the surgical repair of hernia and along with orchiopexy for the closure of associated patent processus vaginalis. Ligation of the hernial sac has been considered mandatory for a successful repair. The present report was designed to study the results of non-ligation of the hernial sac before excision at the neck. It was found that non-ligation has no untoward effect on early complications and recurrence rate on long-term follow-up. It is suggested that it is not necessary to ligate the hernial sac during herniotomy in children.

Keywords Herniotomy · Ligation · Hernial sac · Pediatric

Introduction

Inguinal hernia is one of the commonest conditions in pediatric surgical practice requiring surgical intervention. Herniotomy after high ligation of the peritoneal hernial sac is the standard procedure performed. It has been increasingly accepted that closure of the peritoneum is not necessary after any surgical procedure. It has also now become the practice to not to ligate the hernial sac during herniorrhaphy for indirect inguinal hernia in adults [1]. This study was planned to study the effects of non-ligation of the sac on the results of herniotomy in the pediatric age group.

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Methods and material

Fifty consecutive children under the age of 12 years (range 5 months to 12 years) undergoing herniotomy for inguinal hernia and orchiopexy were selected for the study. All the patients were males. None of the cases included in the study had incarcerated hernia requiring taxis or obstructed hernia. The cases were divided randomly in two groups and the two groups matched in clinical variables. The herniotomy was done under general anaesthesia with caudal block for post-operative pain relief. In the control group the standard technique of high ligation of the sac before division was performed. In the study group the hernial sac was dissected to the neck of the sac and was left open after amputation at the level of the internal ring. The patients were followed at 1 week, 2 weeks, 6 weeks, 12 weeks, 6 months and 1 year.

Results

During the early follow-up patients were examined for early post-operative complications such as infection, retention of urine, fever and hematoma formation. The incidence of these was similar in the two groups (Table 1). There was no increased incidence of hematoma due to bleeding from the cut edges of the hernial sac in the study group. In the long-term follow-up of the patients, no recurrence was noticed in either group. The patients continue to be in further follow-up for any recurrence.

Discussion

Herniotomy is the standard surgical procedure for the treatment of inguinal hernia and is part of standard orchiopexy for patent processus vaginalis. It has been considered mandatory that the hernial sac be closed by ligation and transfixation at the neck before division. Any failure to do so has been fraught with increased rate of recurrence of hernia.

It has been well proven that peritoneal defects close by metamorphosis of the in-situ mesodermal cells. In their study Hubbard et al. [2] demonstrated that defects

Table 1 Comparison of early post-operative complications in the two groups

Complications	Study group (n = 25)	Control group (n = 25)
Fever (less than 38°C)	7 (28%)	6 (24%)
Infection	1 (4%)	2 (8%)
Haematoma	Nil	Nil
Scrotal swelling	3 (12%)	2 (8%)
Retention of urine	Nil	1 (4%)

on the parietal peritoneum healed with less adhesions if left open than if closed with silk or catgut and suggested that peritoneal defects be left open after surgery. A protective layer forms within a matter of hours when a raw area is created on the peritoneum. Ellis [3] demonstrated in 1962 that tissue ischemia is a potent stimulus to adhesion formation. The adhesions formed between the sac and the irreducible hernia may represent the response of anoxia of the strangulated tissue. Other authors have also demonstrated that closure of peritoneum is not necessary after surgical procedures and gynecological surgeries [4, 5].

Ferguson [6] questioned the necessity of closure of the peritoneal defect at the level of the parietal peritoneum after the proximal sac has been excised during herniotomy. He found that the excision is more complete and rapid when no ligature or suture is contemplated. There was no increase in the recurrence rate on the long-term follow-up of his patients ranging from 5 months to 84 years. Smedberg et al. [7] carried out a prospective study to assess the need to close the hernial sac during herniorrhaphy after excision of the sac. They concluded that indirect hernial sacs can be resected and not ligated without the occurrence of decline in the quality with regards to recurrence rate and there seems to be reduction in the discomfort in the post-operative period. Shulman et al. [1] and Abrahamson [8] have been performing herniorrhaphy for indirect inguinal hernia in adults without ligation of the sac with no apparent adverse effect on the results including recurrence.

Our experience with pediatric herniotomy without ligation of the sac has been quite encouraging. In the short-term follow-up, we have not found any increase in the early complication rates nor have we encountered any recurrences. Any increase in the recurrence due to non-ligation of the hernial sac alone should occur in the first few weeks after surgery [7]. The patients are in follow-up for further assessment regarding recurrence. Though there were no prematures or children less than 6 months during the course of study, we believe that the technique could still be practiced in this group of patients where the sac is thin and frequently tears during

dissection and attempts to ligate and transfix it. Further studies are required to assess the results of this technique in these children. We did not assess the decrease in immediate post-operative pain as caudal block was given for pain relief.

The technique of non-ligation has many advantages:

1. The technique of herniotomy becomes simpler and safer if non-ligation is practiced as there is less chance of injuring cord structures or vessels.
2. Higher excision of the sac is possible when contemplating non-ligation and there is no chance of leaving a stump of peritoneal sac.
3. The technique is very useful when the sac is very thin and flimsy as in premature children and in association with undescended testis. Any attempt to stretch the peritoneal sac for ligation tends to tear it further.
4. The method is of special importance when dealing with sliding hernia. There is no need to re-peritonealize the abdominal contents after excising the hernial sac.
5. There is no increase in immediate post-operative complications.
6. There is no increase in the recurrence rate due to non-ligation of sac.
7. Though it has been suggested that omission of ligation of the sac results in less post-operative pain at the site this needs further evaluation.

In conclusion, hernial sac can safely be left open during herniotomy in the pediatric age group without any adverse effects on the results.

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