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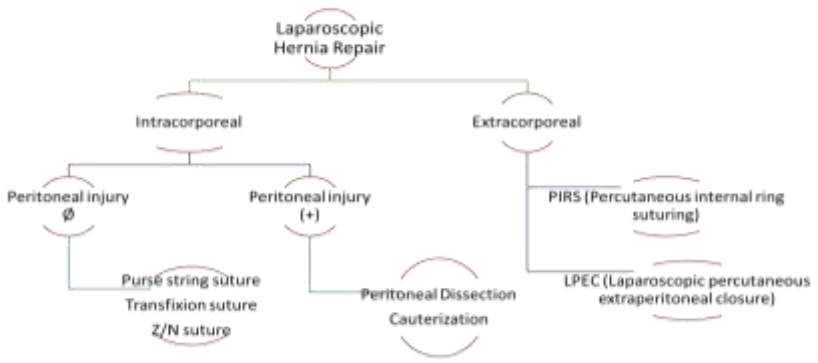
ADDITION OF PERITONEAL DISSECTION OR CAUTERIZATION TO PURSE STRING SUTURE DURING INGUINAL HERNIA REPAIR INCREASES PERI-HERNIA SAC NECK COLLGEN FORMATION

Cansu Kural[1], Oktay Ulusoy[1], Busra Yucesoy[1], Oguz Ates[1], Gulce Hakguder[1], Safiye Aktas[2], Mustafa Olguner[1], Feza Akgur[1]

[1] Dokuz Eylul University, Department of Pediatric Surgery and Division of Pediatric Urology, Izmir, Turkey.
[2] Dokuz Eylul University Oncology Institute, Department of Basic Oncology, Izmir, Turkey

Introduction

Indirect inguinal hernia is often encountered in childhood and requires surgical treatment. Current literature and guidelines recommend laparoscopic hernia repair (LHR). Recent data shows that the recurrence rates and complications are similar when compared to open repair (1.1 vs 1.2%, *p*= 0.87) (Morini et al. 2022) . It allows contralateral evaluation and shortens operation time for bilateral cases.



Many authors have described different approaches when it comes to peritoneal injury. All these techniques have similar or comparable outcomes when compared with open hernia repair.
Peritoneal dissection alone → 14-month follow-up no recurrences (Montaño et al. 2017)
Burnia → 25-month follow-up no recurrences (Novotny et al. 2017)
Peritoneal dissection + suture ligation → 1-year follow-up recurrence rate 0.6% (Esposito et al. 2009)
LPEC + peritoneal cauterization → 4-year follow-up recurrence rate 1.8% (Son et al. 2023)

However, determining the actual success of these techniques can be difficult because recurrence is based on only clinical observation. There is rarely an opportunity for another laparoscopy. And studies about the histopathologic effects of different inguinal hernia repair (IHR) techniques are lacking. Therefore, with our previous experience, we aimed to evaluate the effects of different peritoneal injury mechanisms on IHR.

Aim

Given our previous experience with different suture techniques and their effects on IHR, in this study **we aimed to evaluate the effects of different peritoneal injury mechanisms on IHR.**

Hypothesis: Does addition of peritoneal injury to suture ligation during IHR result in better fibrosis?

Study Design: We used 35 adult (3-6 months old) Wistar albino rats weighing 260-300 gr and divided them into five groups (Table 1).

Table 1. Divided groups and the surgical interventions applied to each group

Groups (n=35)	Description
Group 1	Control
Group 2	Sham (median laparotomy and handling of the internal ring)
Group 3	IHR with suture only (purse-string suture + transfixion suture)
Group 4	IHR with peritoneal dissection + same suture technique
Group 5	IHR with peritoneal cauterization + same suture technique

In group 3 we performed median laparotomy followed by closure of the internal inguinal ring with purse-string plus transfixion suture (Fig 1). In group 4, we added peritoneal dissection using micro-scissors prior to the same suture technique (Fig 2). And in group 5, we used a bipolar cautery around the hernia neck prior to the same suture technique (Fig 3).


Figure 1

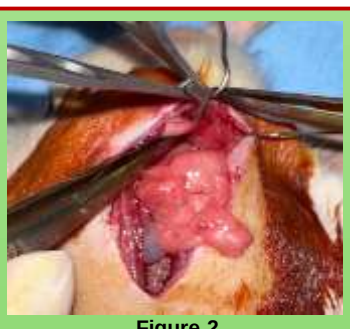


Figure 2


Figure 3

Animals were sacrified three weeks later to excise the inguinal canals. Each sample was prepared using hematoxylin and eosin staining. On each sample collagen thickness was measured from 5 different areas around the sutures. The measurements were performed on an Olympus BX51 microscope, and the images were evaluated with an Olympus SC50 camera and the Olympus cellSens Standard image analysis program.

Results

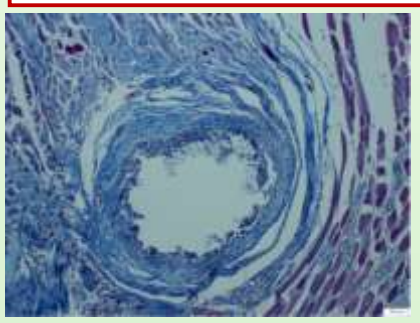


Figure 4

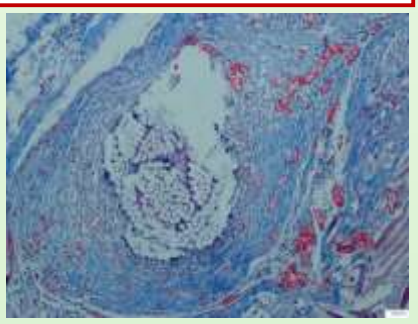


Figure 5

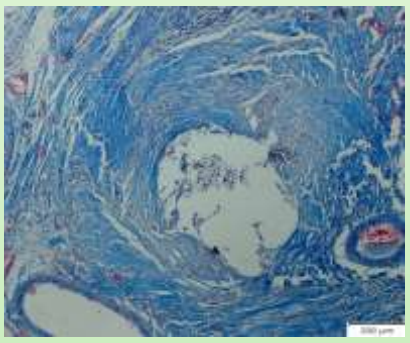
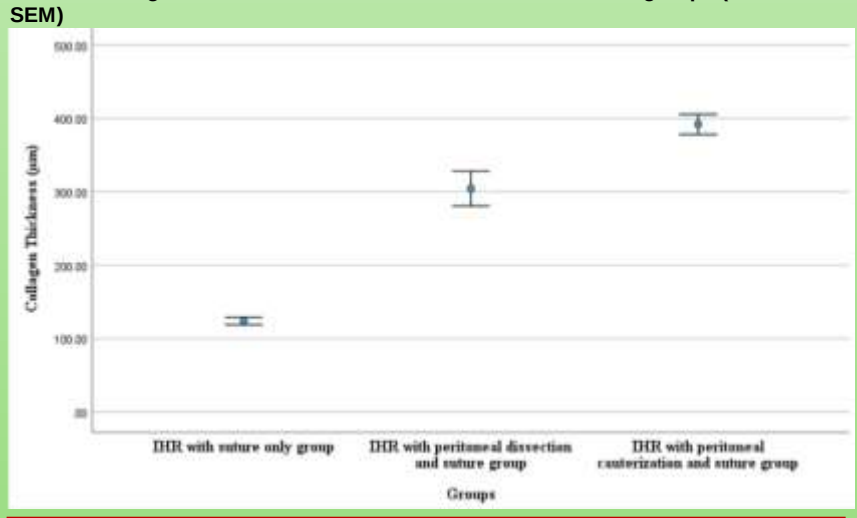


Figure 6

Groups	Collagen Thickness (µm)
IHR with suture only group (Group 3) (Fig 4)	124.02 ± 4.99
IHR with peritoneal dissection and suture group (Group 4) (Fig 5)	304.29 ± 23.69 *
IHR with peritoneal cauterization and suture group (Group 5) (Fig 6)	391.90 ± 13.76 **

* *p*<0.001 compared with IHR with suture only group
** *p*<0.05 compared with IHR with peritoneal dissection and suture group

Table 2. Collagen Thickness around the suture material of the groups (Mean ± 1 SEM)



Conclusion

Peritoneal injury mechanism to suture ligation promotes a better fibrosis around the inguinal hernia neck. **We have found that the cauterization method caused significantly more fibrosis when compared with dissection.**