USING HISTOACRYL FOR MESH FIXATION IN LAPAROSCOPIC INGUINAL HERNIA REPAIR

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ABSTRACT

Background: the treatment of inguinal hernia had many changes over the last years. There has been a lot of time waste discussing the advantages and disadvantages of laparoscopic approach in comparison to standard open mesh repair. Most of inguinal hernias in adults are managed by applying a mesh. To prevent mesh mobility and thus recurrence, different types of fixation have been used. In contrast to ordinary fixation known to cause chronic discomfort, adhesive fixation is becoming increasingly popular as it minimizes markedly the risk of injury and chronic pain. Cyanoacrylate is used in multiple medical indications due to its fast action, excellent tissue bonding strength and low price. Aim: the main objective is to highlight the rationale (e.g., safety) for using non-fibrin based glue in this type of procedure. Patients and Methods: we use histoacryl to fix prosthetic meshes in 50 laparoscopic TAPP repairs. Follow-up time was 1 year. Results: it showed the following advantages: fast application of the glue, reduced postoperative pain, 0.0% infection rate, continuously low recurrence rate and shorter hospital stay. No adverse effects and no complaints were recorded. Conclusion: the safe use and the excellent cost-benefit ratio of histoacryl compared with other techniques of mesh fixation.

Keywords: laparoscopic hernia repair, mesh fixation, histoacryl.

INTRODUCTION

Cyanoacrylate is the generic name of a group of fast-acting adhesives such as trade names like Histoacryl. Cyanoacrylate is an acrylic resin that polymerizes exothermically in the presence of water, especially with hydroxide ions, joining the bonded surfaces in 5–6 sec and reaching the final stage in 60 sec. It fuses with body tissue excellently and shows bacteriostatic effects (Fig. 1&2) [1-7].

The film of glue is eliminated by hydrolytic breakdown, it has been used in sutureless surgery since the early 1970s. it is used commonly and in general do not cause pain [2-4].

Fig.(1): histoacryl ampoules.

Fig.(2): equipments.

Since the use of prosthetic meshes in the 1960s, a major concern has been to prevent mobility of the mesh before it is incorporated and fixed in its original position [4-7].

Laparoscopic inguinal hernia repair is accomplished by two approaches; trans-abdominal pre-peritoneal (TAPP) and totally extra-peritoneal repair (TEP) [3, 4].

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Intra-abdominal pressure helps to maintain the mesh in place until it is fixed. In the early 1990s, laparo-endoscopic surgeons started imitating the successful Stoppa procedure in the form of TEP and TAPP. However, they found the extent of dissection of the preperitoneal space recommended by Stoppa to be too large, so they reduced the dissection and used smaller meshes but stronger fixation [7-15].

In the way to prevent mesh mobility being one of the most frequent causes of recurrence, many tacking tools, staplers and suturing techniques were used to overcome this problem. During the same period, two recent anatomic areas of the groin were delineated: the triangle of doom and the triangle of pain. The vulnerable structures in these anatomic areas made penetrating fixation hazardous due to the risk of vascular injury or chronic pain (Fig. 3 a & b) [8-13].

![Fig. (3-a): laparoscopic anatomy of the inguinal region.](image)

In 2001, Katkhouda et al. [12], proposed to use sealants to fix the mesh. The ordinary fixation used may cause acute or chronic pain and increases both direct and indirect costs. Lovisetto [25], reports lower incidence of postoperative discomfort and earlier recovery of activities when comparing glue with suture fixation in TAPP repair [17-22].

**PATIENTS AND METHODS**

Between December 2013 and January 2015, in well specialized center we treated 50 inguinal hernias using the TAPP technique. Initially, we used Prolene mesh for its convenient properties. We fixed meshes with drops of histoacryl in all four quadrants. The remaining glue was often used to adapt the peritoneal edges in order to facilitate final peritoneal closure with a prolene 3-0 running suture.

**Inclusion criteria:**
1. Patients are above 18 years and below 60 years.
2. Patients are fit for surgery with all organs functions within acceptable ranges.
3. All patients who are mentally oriented and consented for joining this research study.

**Exclusion criteria:**
1. Recurrent and femoral hernia.
2. Metabolic diseases (diabetes and morbid obesity).
3- Patients with oral anticoagulant treatment.

**Preoperative care:**

Complete preoperative laboratory investigations were ordered. Patients were not allowed to undergo the operation unless their investigations were within acceptable range.

**Technique:**

Once the pre-peritoneal space is dissected, and all hernia sacs are reduced, the mesh is secured to the abdominal wall. The glue application catheter is introduced through the skin incision (para-rectal right). It must be kept dry as long as possible to prevent the histoacryl from polymerizing in contact with the humid tissue. An insulin syringe is used to facilitate drops distribution of the glue.

Two 5 mm graspers allow control of glue application. An experienced assistant is able to apply over 20 “drops” from a 1 cc glue content. The glue is ejected from the applicator by expelling the air. The drops of glue are placed on the mesh, which is pressed gently against the underlying tissue, above the symphysis pubis, above the pubic arch medial of femoral vein, over the triangle of doom and triangle of pain, at the level of the superior iliac spine and medial and lateral of the inferior epigastric vessels (Fig. 4).

**Figure (4): Intra-operative technique.**

![Image](image1.png)

**Fig. (4): A: Port sites and technique. B: Mesh in place. C&D: Histoacryl use.**

The peritoneal edges are then sutured, the CO2 is released, and any trocar incision bigger than 5 mm is closed in layers. Finally, the wounds are infiltrated with long-acting local anesthetic.

**RESULTS**

Consecutive inguinal hernias repair was done in 50 patients (47 men and 3 female) with a median age of 45 years (range 16–81 years). In 45cases (90%), the hernia was indirect, 5 hernias (Table 1).

Over 98.5% of the patients were discharged on the following day. Two to three days after patient discharge, feedback was obtained from 100% of patients. Ten days after surgery, 99% of the patients had been examined by the operating surgeon; 5–6 weeks postoperatively, 97% of all the patients had either a clinical control by the operating team. In the postoperative follow-up, we recorded VAS (Visual Analog Scale for Pain) scores to improve pain management in all patients.

**Table (1): Results.**
Assessment of intensity of postoperative pain was evaluated according to the visual analogue scale (VAS); this scoring system is graded from 0 to 10, where 0 = none or no pain, VAS 1–3 = mild pain, VAS 4–6 = moderate pain, and VAS 7–10 = severe pain. Nalbufen (20 mg) ampoule was the standard analgesic for all patients on the postoperative day. The postoperative need for analgesia was lower (p < 0.01) No perioperative complication was encountered.

RECURRENT
In a long-term follow up, recurrence rate was 0.0%.

DISCUSSION
Histoacryl has been shown to be safe and effective in multiple clinical studies. Extensive chemical and mechanical testing has been performed as well. All show that it's safe to use as a tissue glue[8].

We have experienced higher patient satisfaction since using glue fixation. To demonstrate less postoperative pain expressed in VAS scores, less analgesics or shortened hospital stay, studies would have to be carried out on smaller patient collectives, in limited time frames, and with a constant surgical team performing a standardized procedure.

The higher patient satisfaction in our trial may be due to one or all of the following factors: increasing learning curve, good tissue dissection, bigger meshes, light-weight meshes, avoidance of ordinary mesh fixation, peritoneal closure with running instead of tacking suture, prudent use of monopolar cautery, infiltration of trocar wounds with long acting local anesthetic, awareness of chronic pain, better information, preparation and motivation of the patient. The overall patient satisfaction we recorded is supported by similar findings of randomized controlled trials reported [24-26]. Very low pain levels, shorter hospital stay, immediate unrestricted physical activity and shorter off-work period are the best indicators [20, 21].

CONCLUSION
This synthetic glue is a very attractive alternative to other methods to fix the prosthetic meshes in laparoscopic hernia repair. It may be a first choice for this indication.

REFERENCES


