

# Hybrid IPOM: A Novel Technique for the Management of Incisional Hernia

Syed Asim Yamin, Shahnawaz Ahangar, Fadi Albadawi, Abdullah Alqarni, Abdulaziz M. Alzahrani

Department of Specialised Surgery, King Abdullah Medical City Hospital, Makkah, Saudi Arabia

Email: shanz101@gmail.com

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## Abstract

**Background and Aim:** The incidence of incisional hernias has been reported to be around 15%. In the present scenario, a wide array of surgical procedures are available for their better management. In this study, we intend to share our experience with one novel technique, “Hybrid IPOM (Intraperitoneal onlay meshplasty)” as a management option for a selected cohort of patients.

**Methods:** This prospective study was undertaken during January 2019 to July 2023 at King Abdullah medical city, Makkah. A total of 51 cases were selected for Hybrid IPOM repair as per inclusion criteria; medium sized (4 - 10 cm) hernia defects; uncomplicated hernias; age more than 18 years. The follow-up period of the patients varied from 6 months to 4 years. The operation commenced with open hernia dissection, mesh deployment into abdomen, defect closure and then conversion to laparoscopy for the posterior mesh placement.

**Results:** A total of 51 cases were repaired successfully with this technique. 48 out of 51 cases were incisional hernias secondary to some primary procedure done either for hernias itself or some other intra-abdominal pathology. The three cases were primary hernias falling in medium to large category with unaesthetic overlying skin. The age range was 19 to 72 years. The mean (range) operative time was 135 (90 - 240) min, and the average blood loss was 70 ml. The mean (range) hospital stay was 3 (2 - 11) days. All patients returned to routine work within 2 - 3 weeks of surgery. The median follow-up was 15 (6 - 48) months. Of the 51 cases, 3 patients developed seroma (managed conservatively), 1 patient developed a large hematoma (needed evacuation), and 1 patient developed superficial wound infection (managed with antibiotics). Two patients had recurrences; one patient had previously failed multiple repairs, and the other developed a postoperative hematoma. None of our patients had an iatrogenic bowel injury. **Conclusion:** Hybrid IPOM technique is a safe, feasible and easily reproducible technique. It may prove easier especially for beginners in laparoscopy, as it achieves faster and easy adhesiolysis thereby reducing operative time and easier establishment of the

pneumoperitoneum. Besides, it gives the chance to excise ugly scars and improve the cosmesis.

## Keywords

Incisional Hernias, Hybrid Surgery, Open to Laparoscopic Conversion, Safety, Feasibility

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## 1. Introduction

Incisional hernias are one of the common issues in general surgery. It is defined as a type of ventral hernia developing after surgical trauma to the abdominal wall. About 15% of the laparotomy incisions would end up developing some sort of incisional hernia ranging from small hernias at the angles to complete suture-failure wound hernia [1]. As per the International endohernia Society (IEHS) guidelines, primary tissue repair is suggested for primary < 2 cm defects and the large > 10 cm hernias are advised to get an open mesh repair. All other hernias can be tackled by open or other minimal access approaches. Open repair is thought to be faster and easier especially for surgeons who are new to laparoscopy [2] [3]. The other aspects include complete hernia sac resection and multiple options for mesh placement [4]. The minimal access approach, on the other hand, would allow the posterior mesh placement and in addition, will allow detection of other missed/occult hernias [4] [5]. Hybrid hernia surgeons combined the speed and ease of open surgery with the posterior-mesh-placement benefits of laparoscopic surgery [5]. The technique has already been tried, tested, and found to be safe as more and more publications are pouring in for its establishment [5]. As for the complications and recurrences, the rates are reported to be comparable to open/laparoscopic repairs [6]. The first proposal of hybrid IPOM surgery came from a Chinese group in 2012 [5]. They suggested that the repair is a good option for complex hernia surgeries. Our study aims to check for the safety and feasibility of this technique in our setup.

## 2. Methodology

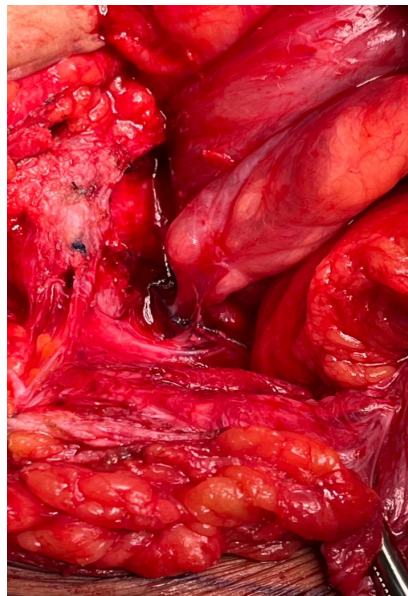
This prospective study was done at King Abdullah Medical city, Makkah. We started our hybrid hernia surgeries in 2019 January for medium-sized (4 - 10 cm defect size), uncomplicated incisional hernias. The patients were selected based on the size of hernia defect. No exclusion was made for sex or previous failed repair-attempts, although only the adults > 18 years old were chosen.

The exclusion criteria included:

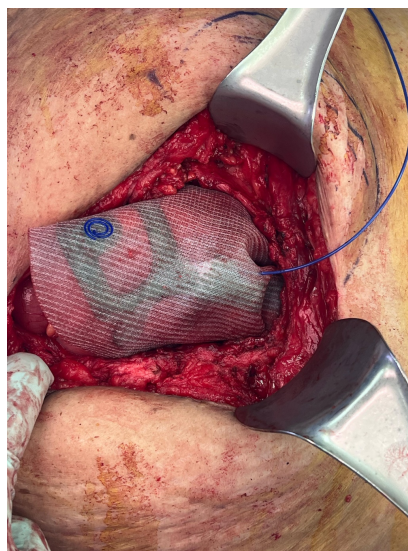
- Patients less than 18 years of age
- Hernia defects less than 4 cm or more than 10 cm
- Complicated hernias like obstructed/strangulated/perforated hernias
- Patients with loss of domain as per Tanaka index and Sabbagh definition
- Patients on active chemotherapy

- Patients with recurrent malignancy
- Patients with known connective tissue disorders

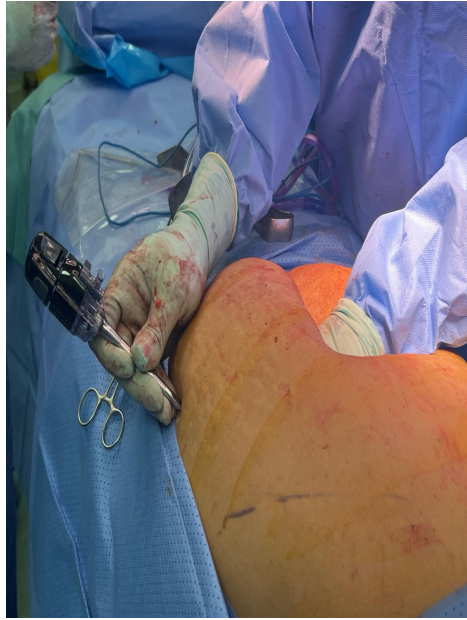
The incision was made along the old scar and was excised routinely. The access was gained to the peritoneal cavity very carefully. The hernia contents were examined thoroughly, reduced back, and only necessary adhesiolysis was done. The hernia sac was excised, and the fascial edges of the defect were assessed for tension-free closure (**Figure 1**). A coated mesh (of appropriate size) was deployed through the defect and the center of the mesh was marked with a long polypropylene suture (like central suture in ventralight echo mesh) (**Figure 2**). Two 5 mm ports were placed on the lateral most abdominal wall under finger guidance (**Figure 3**). The fascial defect was closed using a barbed suture, keeping



**Figure 1.** Open adhesiolysis in a patient with previous failed mesh repair.



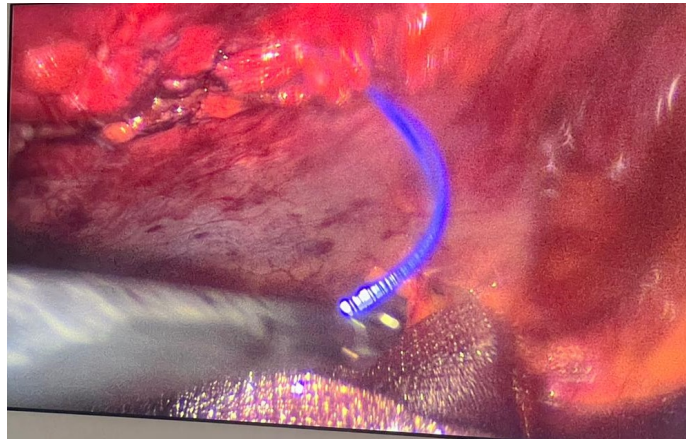
**Figure 2.** Mesh deployment through the wound.



**Figure 3.** Hand-guided port placement for Laparoscopy.

the central suture of the mesh out from the incision. This was followed by abdominal insufflation and inspection of the repair from peritoneal side and a look-up for any missed or occult hernias (**Figure 4**). A 5 mm 30 degrees scope was used. The central mesh-suture was hitched up, and the mesh was tacked using both non absorbable tacks and absorbable tacks (**Figure 5**). Additional ports were inserted whenever necessary, either for mesh unfolding or fixation. The ports were removed under vision followed by skin closure (**Figure 6**). TAP (transversus abdominis plane) block was given as a routine for postoperative analgesia. The parameters recorded were operative time (skin to skin), intra-operative complications, and blood loss. The patients were managed in regular wards in the postoperative period. The patients were made ambulant on the same day and liquids were allowed orally. The diet progressed as the patient felt comfortable to eat. Prophylactic anticoagulation started 8 hours postoperatively routinely. The postoperative pain was managed by TAP block and IV opioids on day 01. By day 2, the patients were mostly comfortable on oral opioids/NSAIDs. Upon discharge NSAIDs as PRN-medication was prescribed. The postoperative parameters recorded were pain, time to ambulate, return of bowel function, drain output (whenever placed) and hospital stay. The safety and feasibility were evaluated based on any untoward events during surgery like enterotomies, difficulties in mesh placement/fixation, ability to complete the procedure successfully within an acceptable timeframe and the postoperative outcomes.

Most patients remained compliant to the postoperative follow-up. Overall patients were satisfied with the results, however, chronic pain and seroma formation remained a concern for some of them. The satisfaction was very much high in patients who had previously failed repairs and those who had the ugly scars excised.



**Figure 4.** Inside view: post wound closure.



**Figure 5.** Final laparoscopic view.



**Figure 6.** Final outside view.

### 3. Results

A total of 51 cases underwent hybrid hernia repair. The selections were made as per our inclusion/exclusion criteria. All cases were operated on by the same surgical team. The results are as follows:

1) Patient cohort: A total of 51 patients fit in the cohort. There were 32 females and 19 males.

2) 48 patients were having incisional hernias whereas 3 patients had large primary hernias with unaesthetic skin bulge with redundancy (these insisted to excise the excess skin). As for the incisional hernias, 28 were not repaired before, 11 had a previous repair (with or without mesh) and the remaining 9 were re-recurrent (multi recurrent) hernias with more than two failed previous repairs. During our hybrid surgery, the old mesh was explanted only if interfered with the new repair significantly or was lying loose.

3) Most of our patients were in the age bracket of 40 to 60 years with a 19-year-old boy being the youngest and a 72-year-old being the oldest patient.

4) Our mean operative time was 135 min. The operative time was longer in our initial phase of the study and in recurrent hernias (especially multi recurrent).

5) The average blood loss was 70 ml. None of the patients needed intraoperative blood transfusion.

6) The patients were mobilized on the same day of surgery and prophylactic anticoagulation was started 8 hours postoperatively as a routine. We are not in favor of routine intra-abdominal drainage; however, we placed drains in a case with ascites and other three cases who underwent extensive adhesiolysis.

7) For postoperative analgesia, the transverse abdominis plane (TAP) block was given by anesthesiologists at the end of the procedure. In addition, intravenous opioids (as PRN) were prescribed on day one and then oral NSAIDs from day two.

8) Orals sips started after 12 hours postoperative. The diet was progressed to full liquids and semisolid once the patient became ambulant and passed flatus.

9) The patients spent 3 days in the hospital on average. The patients reported on the day of surgery and were admitted for a range of 2 to 11 days. The hospital stay got prolonged in a patient who developed a large postoperative hematoma.

10) Five patients lost follow-up after 2 years of surgery.

11) We had a total of 5 minor complications including: 3 seromas (managed conservatively), 1 large hematoma (needed evacuation); 1 wound infection (managed with a prolonged course of IV and then oral antibiotics; it did not require explantation though).

12) Two patients had recurrences; the patient who needed hematoma evacuation and the another who had previously multiple failed repairs. These results are tabulated as under **Table 1**.

### 4. Discussion

The prevalence of incisional hernias is expected to rise as more complex (especially,

**Table 1.** Patient demographics, intraoperative details, and post-operative complications.

Total patients	51	Percent
	Primary ventral hernias: 3 Cases	5.8%
	Incisional hernia: 48 cases	94.2%
	<ul style="list-style-type: none"> <li>● Never operated for hernia 28 cases</li> <li>● Single recurrent 11 cases</li> <li>● Multi-recurrent 9 cases</li> </ul>	<ul style="list-style-type: none"> <li>● 54.9%</li> <li>● 21.7%</li> <li>● 17.6%</li> </ul>
Median age/age range	42 years; range 19 - 72 years	-
Average Blood Loss	70 ml (range 10 ml to 150 ml)	-
Operative time (range) in min	135 (90 - 240) min	-
Iatrogenic bowel injury	0	0%
Occult hernias found	5 (3 inguinal, 1 epigastric and 1 spigelian)	9.8%
Median hospital-stay	3 days (range 2 to 11 days)	-
Follow up	15 (6 to 48) months	-
Hematoma	01	1.96%
Seroma	03	5.88%
Wound Infection	01	1.96%
Recurrences	02	3.92%

malignancy) cases are being tackled with radical procedures. Hernia repair surgery has undergone tremendous progress in recent decades. This was possible by the introduction of minimal access tools (laparoscopic as well as robotic). Also, use of Botox, preoperative progressive pneumoperitoneum and fasciotomies has given us other options to operate previously-considered-inoperable hernias [7] [8] [9] [10]. Patients with incisional hernia may be completely asymptomatic and seek treatment only for aesthetic purposes or may be experiencing pain, recurrent bowel obstructions and impairment in daily functions of life. The operative-procedure choice depends on many factors, especially the size of defect, besides the surgeon preference/experience. Several procedures and different variations of the same procedure exist at present. The era of hernia repair started with open tissue repair followed by mesh repairs, and finally, the advent of laparoscopy infused new enthusiasm in hernia surgeons. There is no clear evidence suggesting absolute superiority of one procedure over the other [11] [12] [13]. The Laparoscopic approach is associated with less pain, shorter hospital-stay, and less blood loss. However, it tends to be time-consuming, difficult in case of dense/multiple intra-abdominal adhesions, especially when the surgeon is on his learning curve [1] [11].

In this paper, we report our experience with one of the procedures called Hybrid IPOM (intraperitoneal onlay meshplasty). It combines open hernia surgery with laparoscopic mesh placement [5]. In 2012 reported this procedure for the first time. They studied various parameters while converting to open from laparoscopy. The timing of decision to convert to open as an early or late decision

was thoroughly explored. They concluded that early conversion saved operative time and had less incidence of iatrogenic bowel injuries [14].

Many subsequent reports of this procedure have already been documented in the literature and considered safe and feasible. Some surgeons start with laparoscopy and then convert to open. We, however, start with open and then convert to laparoscopy after adhesiolysis, mesh deployment and tissue repair. Amaral *et al.* commenced their hybrid repairs with laparoscopy, do adhesiolysis and then followed it up by open mesh placement, and laparoscopic fixation in the final part [7].

Ahonen-Sirrtola and Ozurk *et al.* described hybrid repair as a mini laparotomy (to facilitate the fascial defect closure) followed by mesh fixation by laparoscopy which is like our technique [12]. Hybrid hernia repair has been reported by many other authors to have less chances of seroma, less mesh ballooning, and a better mesh fixation [1] [9].

Hybrid surgery is less time consuming than pure laparoscopic procedures due to faster adhesiolysis and quicker suturing of the defect. The average time in our study was 135 min which is in concordance with the literature.

We did not have any iatrogenic enterotomies in patients. The old meshes were removed only if necessary for the present repair. The dense adhesions were kept attached to the bowel wall during adhesiolysis.

We found 5 occult/previously not reported hernias on diagnostic laparoscopy. Three were inguinal, one spigelian and epigastric. All of these were repaired at the same time as the patients were consented to repair occult hernias beforehand.

In the literature, there is no clear superiority of open versus hybrid repair as far as pain is concerned. However, pure laparoscopic procedures are found to be less painful [11]. The minor postoperative complications in our study including seroma (5.9%); hematoma (0.5%) and wound infection (0.5%) are in the ranges depicted in various studies. The seromas were managed watchfully. One hematoma needed evacuation as the patient experienced pain. The wound infection was managed by IV and then oral antibiotics. Only two patients developed recurrences in our study. One patient, who had hematoma and the other patient, had multiple failed repairs. The recurrence rate in our study is approximately 1% which is slightly lower than documented in the literature 5% - 6% [12]. The reasons might be that our study is the latest, vast surgeon experience or even small sample-size.

## 5. Conclusions

Hybrid IPOM technique is a safe, feasible and easily reproducible technique. The main advantages of this procedure as per our experience are:

- 1) It is quicker than laparoscopic repair.
- 2) It is easy to learn and teach, especially for beginners.
- 3) The old and ugly scars can be existed.



- 4) The mesh is placed posterior to the defect.
- 5) We can find other occult/missed hernias on laparoscopy.
- 6) Less seroma formation and lesser iatrogenic bowel injuries.
- 7) The incision allows to remove any specimens e.g. old mesh or other tissue which has been excised a part of compound procedure.

We, however, need larger studies to explore the full potential benefits of hybrid hernia surgery. The sample size of the selected cohort remains the main limitation of this study.

## Ethical Clearances

Sought as per the norms.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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