

NATIONAL STUDY ON THE SURGICAL TREATMENT OF INGUINAL HERNIA IN MOROCCO

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ABSTRACT

Background: Over 20 million inguinal hernia repairs are performed in the world every year. These repairs require the use of various techniques. The goal of this study was to audit the results of the surgical treatment of inguinal hernia repairs in adults in Morocco. **Methods:** This nationwide cross-sectional prospective study has been conducted by the Moroccan Society of Surgery and the Moroccan Society of Digestive Surgery. It included male patients aged 18 and above, with an inguinal hernia was repaired during the 30 days recruitment phase. The measured outcomes were: anesthesia type, preoperative antibiotic treatment, surgical technique, length of in-hospital stay and intraoperative and postoperative complications up to 30 days. **Results:** The response rate of the survey was 88.78% which led to the study of 95 cases. 12 patients (12.6%) received general anesthesia, 82 patients (86.3%) regional anesthesia, and 1 patient (1.1%) local anesthesia. No prophylactic antibiotics were prescribed to 14.7% of cases while they were systematically administered to 84.2% of the patients at the induction, and a few days prior to surgery for one patient. 83.2% of the patients were operated with the Lichtenstein technique. Laparoscopic trans-abdominal preperitoneal approach (TAPP) was performed on 11.6% of the patients. Outpatient surgery was performed on 2.1% of the patients. 12 patients developed a postoperative seroma. Two patients developed a postoperative hematoma. One patient died postoperatively. **Conclusion:** This study showed disparities in the perioperative management of inguinal hernia in Morocco. Scholarly societies could play a significant role by programming ongoing training sessions to promote the best practice of inguinal hernia repair.

Keywords: Inguinal Hernia; Laparoscopic Repair; Lichtenstein Repair; Surgical Audit.

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INTRODUCTION

Inguinal hernias are the most common out of all hernias in both sexes (1). The lifetime risk of an inguinal hernia is 27% for men and 3% for women (2), which leads to 20 million repairs worldwide every year (3). The clinical presentations of inguinal hernias are numerous and their surgical treatment calls for various techniques. In Morocco, there is a prominent disparity in terms of types of structure, human assets and available equipment, patient selection, and perioperative management protocols. However, there are no available objective data in this subject in the official Ministry of Health documents and

scientific articles, memoirs, and research. In such circumstances where the exact understanding of the practical approach and results is lacking, it remains impossible to establish the suitable recommendations that would be specific to our national context. Additionally, determining the ongoing training strategies and support plans to Moroccan surgeons with the aim of patient care improvement after inguinal hernia diagnosis is impossible. To that end, the Moroccan Society of Surgery purposely introduced this open prospective project to all Moroccan surgeons to evaluate the current practice and outcomes of surgical treatment of inguinal hernias.

The general purpose of this study is to review the perioperative management and outcomes of inguinal hernia surgical treatment in adults in Morocco.

The specific objectives are to describe surgical technique data, intraoperative complication rate, length of in-hospital stay, and postoperative complications.

METHODS

This nationwide cross-sectional prospective study is based on the voluntary participation of Moroccan surgeons. Patients have been selected over a 30-day period after giving informed consent. Perioperative and postoperative data on postoperative day 30 and 90 were stored on a computer file or hard copy folders (as per surgeons' preference). All data were collected anonymously for patients and surgeons' identities. Therefore, information about surgeons will not be available. This research was accepted by the ethical committee of the University of Rabat.

Patients included in this study were males aged 18 and above, who had an inguinal hernia that had been clinically diagnosed by a surgeon and repaired during the defined recruitment period. Exclusion criteria comprised female patients, femoral hernias, and patients who refused to be part of the study. Female patients were excluded because inguinal hernia is more common in men, and there are significant anatomical and surgical differences between men and women that would have biased the interpretation of the results.

Patients' variables consisted of age, gender, physical status according to the American Society of Anesthesiologists (ASA), co-morbidities, body mass index, the location of inguinal hernia, recurring hernia, initial surgical technique, emergency surgery for strangulated hernia, hernia progression period in months, and hernia reducible character or not.

Disease-related variables consisted of the type of anesthesia, preoperative antibiotic treatment, the type of inguinal hernia, the size of parietal defect in centimeters, surgical technique, type of mesh, surgical method to fix the mesh, suture type, per operative vas deferens injury, spermatic cord injury, per operative nerve injury, per operative visceral injury, conversion from laparoscopic to open surgery, and operating time in minutes.

The variables related to the early follow-up period were length of in-hospital stay in days, postoperative antibiotic treatment, period of postoperative antibiotic treatment in days, postoperative seroma, postoperative hematoma, wound infection (and whether the mesh has been removed in case of infection), revision surgery, major complications requiring intensive care unit admission,

postoperative death, POD30 follow-up, groin pain, and hernia recurrence.

IBM SPSS Statistics version 23.0 is used for statistical analysis. We calculated the relative frequency (percentage) for the qualitative variables. We have calculated means, medians, standard deviations and determined the absolute values for the quantitative values.

RESULTS

Figure 1 is a diagram showing the number of both included and excluded patients throughout the study. Among 107 repairs in the database, 95 were included in the analysis. **Table I** summarizes the patient characteristics.

Table I: Surgical techniques in the treatment of inguinal hernia

Surgical Technique	Number of cases	%
Lichtenstein mesh repair	79	83.2%
Laparoscopic TAPP	11	11.6%
Bassini technique	3	3.2%
Shouldice technique	1	1.1%
Rives technique	1	1.1%

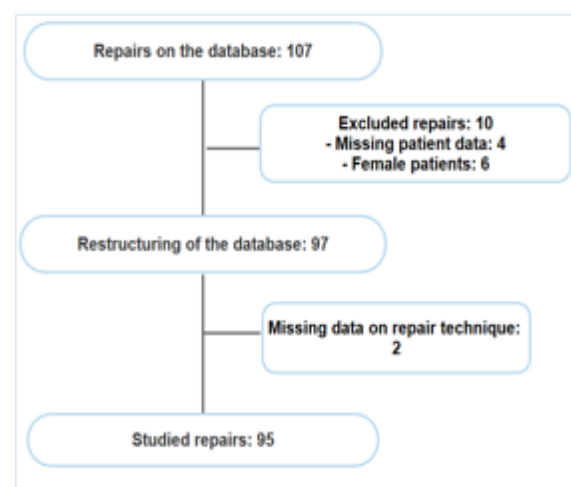


Figure 1: Flowchart of included patients

In our study, 54 patients (56.8%) had an indirect inguinal hernia, 27 patients (28.4%) had a direct inguinal hernia, and 13 patients (13.7%) had a scrotal hernia. *Seven patients had*

Emergency surgery for strangulated hernia.

For surgical treatment, 12 patients (12.6%) had general anesthesia, 82 patients (86.3%) regional anesthesia, and 1 patient (1.1%) local anesthesia. No prophylactic antibiotics were prescribed to 14.7% of the patients while they were systematically administered to 84.2% of the patients at the

induction, and a few days prior to surgery to one patient.

Table I shows the results of the operative techniques. 83.2% of the patients were operated with the Lichtenstein technique, and 11.6% with laparoscopic TAPP.

93.7% of inguinal hernias (89 cases) were repaired using a polypropylene mesh, of which 79% were fixed with absorbable sutures, 10% with non-absorbable sutures, and 7.8% with non-absorbable tackers, 1.1% (1 case) with a polyester mesh (e.g. Mersilene) that was fixed with non-absorbable sutures, and 1.1% (1 case) with polyglycolic acid mesh that was fixed with absorbable sutures. Patients with at least one lesion discovered intraoperatively represent 5.26% (5 cases) and are illustrated as follows on Table 2.

Operative time was greater than or equal to 40 minutes for 50% of patients, counting from skin incision to completion of skin closure. 60% of these patients were prescribed postoperative antibiotic treatment.

Table II: Intra-operative complications

Intraoperative injury	Number of cases	%
Vas deferens injury	2	2,1%
Spermatic cord injury	3	3,1%
Nerve injury	3	3,1%
Visceral injury to the bladder	1	1,1%

Length of in-hospital stay ranges from 0 to 8 days with a median of 1 day. Patients with at least one operative morbidity represent 12.6% (12 patients), described in **table III**.

Table III: Post-operative complications

Operative morbidity	Number of cases	%
Post-operative seroma	12	12.6%
Post-operative hematoma	2	2.1%
Wound infection	1	1.1%

Two patients (2.1%) have developed a severe complication requiring ICU admission, and one of them died during the postoperative period (peritonitis after visceral injury). He was a 23 year-old patient with an American Score of Anesthesiologists score of 4 (diabetes, heavy smoker and ischemic cardiopathy), who underwent emergency surgery for strangulated and recurrent inguinal hernia.

DISCUSSION

This study has allowed the review of surgical practice in the treatment of inguinal hernias in

Morocco. In the discussion, we will compare the results to the recommendations of the European Hernia Association (EHA) to identify the situations that would require continuing medical education programs for Moroccan surgeons.

Most of the surgeries (86.3%) were performed under spinal anesthesia. This is not recommended by the EHS which actually recommends the use of local anesthesia by perioperative field blocks and/or subfascial/subcutaneous infiltrations in cases of open repair, provided that the surgeon is experienced (3). General anesthesia was used on 12.6% patients whose age was 65 or less. Hernia Surge recommends the use of general anesthesia rather than regional on patients aged 65 and above because it could be associated with myocardial infarction, pneumonia, and thromboembolism (3, 4).

84.2% of our patients were systematically prescribed prophylactic antibiotics at the induction while prophylactic antibiotic treatment in patients with low to moderate risk is not recommended for open repair surgery according to the EHS. In laparoscopic repair, prescribed prophylactic antibiotics are never recommended.

In our case series, 83.2% of the patients were operated with the Lichtenstein technique with a standard flat mesh. This technique is highly recommended as a first line treatment (3). Laparoscopic TAPP was used on 11.6% of the patients. This number is insufficient according to the EHS recommendations that have concluded with moderate proof that the laparoscopic method is the reference technique for bilateral hernia repair. Moreover, these techniques have a faster recovery time, a lower risk of chronic pain, and are economical (5-8).

Outpatient surgery was used in only 2.1% of the patients. In a country of low socioeconomic status, outpatient surgery should be considered for all uncomplicated inguinal hernias (both open repairs and endoscopic) as long as less disposable products are used and an adequate follow-up is scheduled (9-11).

In the postoperative period, 12 patients developed a postoperative seroma, of which 5 patients had been operated using laparoscopic TAPP. This follows the EHS recommendations that confirm the low incidence of seroma complication in open repair surgery. Risk factors of postoperative seroma include coagulopathy, femoral hernia and congestive liver failure (12, 13). The inversion and fixation of the transverse fascia during the laparoscopic repairs of large hernia sacs could potentially lower the risk of seroma and hematoma. One patient (1.1%) died in post op. According to the EHS recommendations, medical comorbidities are the main cause of death and should be taken into consideration when

planning surgery, especially for older people (3, 16, 17).

Amongst the study limits, there is the low number of included patients. The participation was voluntary and declarative by the surgeons. Because of this, the results might not be representative of the actual situation. However, we have been able to identify points that require improvement in inguinal hernia surgery in Morocco through this nationwide study. Here comes in the role of the scientific societies, through continuing medical education sessions, dedicated to the surgery of inguinal hernia with the aim of sensitizing surgeons to the following: the use of local anesthesia and perioperative field blocks and/or subfascial/subcutaneous infiltrations given their advantages, the insignificance of antibiotic therapy outside emergency cases, the use of the laparoscopic technique, and the learning of other techniques, allowing different approaches specific to each patient based on their comorbidities and history of surgery. Finally, as a quality management approach, we can suggest to establish a national register of inguinal hernias in Morocco.

CONCLUSION

This study has allowed to evaluate the current surgical practice of inguinal hernia in Morocco. It allowed to specifically identify the items on which additional training is mandatory. The implementation of a national register will allow the long-term surveillance of surgical quality of patients and facilitate the improvement of surgical care in every institution.

Abbreviations:

EHS: European Hernia Society
ASA: American Score of Anesthesiologists

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Ethics statement:

All authors declare no conflict of interest.

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