Proline Mesh (Patch And Plug) Repair Of Inguinal Hernia Under General Versus Local Anaesthesia : Early And Long-Term Outcomes

Jawad Kadhim Al-Dhahiry
AL-Karama Teaching Hospital, Medical college , Wasit University, Iraq .
email jawaddhahiry@gmail.com
(Received 13/1/2013, Accepted 26/3/2013)

الخلاصة

هنالك معلومات وبيانات قليلة حول جراحة الفتوقات المغبنية باستخدام شبكة البرولين تحت التخدير الموضعي والتخدير العام. تمت الدراسة خلال فترت اربع سنوات ونصف السنة في مستشفى الكرامة التعليمي في مدينة الكوت ،من الاول من شباط 2008 الى الثلاثين من حزيران 2012 واحصيت النتائج من مجموعة التخدير الموضعي وقورنت بمجموعة التخدير العام من حيث المضاعفا ت المبكرة والمتاخرة ونسب رجوع الفتوق، فوجدت النتائج متماثلة من حيث المضاعفات المبكرة والمتاخرة للمجموعتين مع زيادة مهمة بعدد الحالات التي تجرى تحت التخدير الموضعي ويتم اخراج المرضى من المستشفى في نفس اليوم مع موافقة و قبول من قبل المرضى من حيث طرق التخدير .فترة المتابعة تراوحت ستة اشهر – الى-ثلاثة وخمسين شهرا .

Abstract

Background: There is minimal data regarding the feasibility of Proline (patch and plug) inguinal hernia repair under local anaesthesia and patient acceptability.This study compares outcomes of Proline (patch and plug) inguinal hernia repair under local anaesthesia versus general anaesthsia . Place and Duration of Study: The study was conducted in Department of Surgery,Al-Karama Teaching Hospital,Medical college/Wasit University,Iraq ,from 1st Faruary 2008 to 30th June 2012 and included 124 male patients. Follow-up period ranged from 6 months to 53 months .Study Design: The study design was a prospective study.Methods: This is a prospective study ,included 124 male patients(female patients were not included in this study) with inguinal hernias that were repaired with Proline (patch and plug) over a 4.5 year period. The outcome (parameters) measures were, the type of anaesthesia used, early and late postoperative complications, and the patient satisfaction. Results: One hundred twenty four inguinal proline mesh hernioplasties were analyzed. Eighty two hernioplasties were performed under local anaesthesia (group A) and fourty two were performed under general anaesthesia (Group B). Patients with a body mass index >30 were 17 (14%) of group A and 8 (6%) of group B, respectively, ($p = 0.7$). Day cases were higher in the local-anaesthesia group (75 days vs. 16 days, $p = 0.001$). Early complications were similar in the two groups. 18 (26%) patients in the local anaesthesia and 6 (19%) in the general anaesthesia developed chronic groin pain ($p = 0.6$). One recurrence was noted in the local anaesthesia group. Patient satisfaction was high with both anaesthetic techniques. Conclusions: Proline (patch and plug) inguinal hernia repair under local anaesthesia resulted in increased day cases with similar complication rate when compared to general anaesthesia. Both anaesthetic techniques were associated with good outcomes and excellent patient satisfaction.

Key words: Inguinal hernia, Mesh repair, Recurrance.

Introduction

Inguinal hernia repair is one of the most commonly performed surgical operations in the world.[1] However, there is no common consensus among surgeons regarding the best choice of anaesthesia and the standred surgical technique. Several surgical techniques have been employed since Bassini,who firstly described his repair in 1889. However, this technique was associated with high recurrence rates ranging from 5 to 21% .[2,3,4] Subsequently, in 1986, the Lichtenstein hernia repair was advocated, which has revolutionized the hernia surgery; it has been the most commonly employed hernia repair during the last two decates . [5]

Since the description of the Lichtenstein repair, several tension-free techniques have been described. The most commonly used techniques are ;the mesh patch and plug repair,[6,7,8] the laparoscopic transabdominal preperitoneal repair [9] and totally extraperitoneal repair, [10] the preperitoneal approach of Nyhus [11] and the Proline Hernia System .[12] Several retrospective and randomized controlled trials have shown that local anaesthesia provided the best clinical and economic benefits to the patients. [13,14] In spite of this fact, the use of local anaesthesia for inguinal hernia repair in the Iraq is not a common practice.

However, there is minimal data comparing Proline patch and plug inguinal hernia repair under different anaesthetic techniques and the long-term outcomes. This study aimed to compare Proline patch and plug inguinal hernia repair under local and general anaesthesias , in a general teaching hospital and analyse the long-term outcomes.

Methods

This study included one hundred twenty four male patients,who underwent Proline (patch and plug) inguinal hernia repair performed by one surgeon over a 4.5 year period (Fabruary 2008- June 2012) . Indications for surgery were symptomatic direct or indirect inguinal hernias . Surgery was also offered where there was difficulty in differentiating between direct and indirect inguinal hernias. No patients who requested hernia repair were denied surgery. The patients were offered the choice of local anaesthesia or general anaesthesia at their outpatient's appointment, and those who requested general anaesthesia had to undergo further anaesthetic assessment prior to surgery. All patients were considered for day case surgery. The patients were not considered for discharge as a day case if they developed postoperative complications and wished to remain in hospital.

The collected data included ;demographics, type of the inguinal hernia and whether the hernia was primary or recurrent one. The intra-operatively collected data included ;operation time for local and general anaesthesia and the amount of local anaesthetic solution used.

The early postoperative outcomes included; local wound complications, urinary retention, day case rates and readmission. The long-term outcomes included ; chronic groin pain and recurrence. All patients were examined at median follow up period of 6 months – 53 months for recurrence.

The Surgical and Anaesthetic Techniques

The anaesthetic mixture used for repair under local anaesthesia consisted of:

20 - 40 mililiters of 2% lignocaine + 20-50 mililiters of 0.9% saline.

This resulted in a total volume ranging from 40 to 100 mililiters to buffer the lignocaine, 5 mililiters of 8.4% sodium bicarbonate were added.The volume of local anaesthetic used was recorded. Initially, 10 mililiters of local anaesthetic were infiltrated along the line of proposed incision followed by 5 mililiters at the surface markings of both the deep and superficial rings to flood the inguinal canal. In addition, further infiltration was given particularly at the pubic tubercle and prior to dissection of the preperitoneal space, according to the patient need.

The mesh-plug operation was performed as described by Robbins and Rutkow [15] using a large Bard Perfix plug-and-patch (C. R. Bard, Inc., Cranston, RI) .

The surgical technique employed was mesh plug with onlay mesh (patch) repair. The hernial sac was dissected and reduced in direct type,while for the indirect inguinal hernia,the hernial sac and its contents were reduced retroperitoneally but ,if the sac was so large ,it was opened ,its contents were reduced intraperitoneally,transfixed at level of deep inguinal ring ,then it was excised distally. The proline mesh plug was used to reconstruct the spatulous deep inguinal ring in case of indirect inguinal hernias and spatulous external inguinal ring in case of direct inguinal hernias. The onlay proline patch was fixed to inguinal ligament and conjoint tendon using a No.2/0 nylon stitches .Four cases required suction drains that were removed 24-48 hour postoperatively.

In addition, questionnaire survey was performed to assess chronic groin pain and patient satisfaction with each anaesthetic technique during the follow up. Chronic groin pain was defined as pain in the groin 6 months after surgery. The patients also were asked if they had no pain, mild pain or severe pain.

Statistical Analysis: Statistical analysis was performed using (SPSS 17) software. Continuous variables were compared using the Mann-Whitney U test and categorical variables were compared using the X^2 test as appropriate. $p < 0.05$ was considered statistically significant.

Results

One hundred twenty four (124) patients with inguinal hernia were incuded during the study period. Proline mesh hernioplasties were performed for them .The median age of the study group was 58 years (range 20-102). Eighty two patients (66%) were operated upon under local anaesthesia (Group A) while fourty two patients (34%) were operated upon under general anaesthesia (Group B) . The of patients with a body mass index >30 were seventeen (14 %) from Group A and eight (6%) from Group B respectively, ($p = 0.7$). The demographics of the patients in the two groups were summarized in (Table 1).

Table. 1. Demographics Of The Patients

Clinical Parameters	Local anaesthesia (n=82)	General anaesthesia(n=42)	P- value
Median age	60 (27–102)	54 (20–65)	0.3
Sex M:F	22:1	22:1	0.3
BMI	25 (23–36)	26 (21–32)	0.9
Primary hernia	81 (65.2%)	39 (31.5%)	0.07
Recurrent hernia	1 (0.8%)	3 (2.5%)	0.07
Direct hernia	24 (19.4%)	20 (16%)	0.06
Indirect hernia	58 (46.8%)	22 (17.7%)	0.06

No significant difference was noticed in incidence of urinary retention, haematoma and wound infection rates (Table . 2.). There were no conversions noted in patients who underwent surgery under a local anaesthesia to a general anaesthesia. The median amount of local-anaesthetic mixture used was 65 mililiters (the range was 35-90 mls). Day case rates were much higher in the local-anaesthetic group compared to general-anaesthetic group (75 vs. 16 days, p = 0.0001). Overall, eighty two cases (82%) were performed as day cases. There was one recurrence (1.4%) noted in the local-anaesthetic group. The recurrence was noted within the first 6 months after the original operation. There was an 88% response to the postal questionnaire survey. Eighteen patients (14.5%) in the local-anaesthetic group developed chronic groin pain while six patients (4.8%) developed chronic groin pain in the general-anaesthetic group . Seventeen patients (13.7%) with chronic groin pain in the local-anaesthetic group had mild pain and all patients in the general-anaesthetic group had mild pain. The groin pain did not affect day-to-day activities and quality of life in either group. One patient developed recurrent herniation in the study (under local anaesthesia group) after a median follow-up period of 3 years (The range was 6 months- 4,5 years). Sixty nine (77.4%) patients were satisfied with the repair under local anaesthesia and sixty seven (61.3%) patients would have the procedure performed under local anaesthesia if needed on the opposite side. The results were summarized in Table .2.

Table .2. Intraoperative And Postoperative Complications

Complications	Local anaesthesia(n = 82)	General anaesthesia (n = 42)	P- value
Operation time per minute	35 (20–50)	32 (20–45)	0.8
Day cases	75 (91%)	16 (30%)	0.0001
Haematoma	3 (4%)	1 (2.4%)	1
Retention	1 (1.2%)	1 (2.4%)	0.5
Infection	3 (3.7%)	1 (2.4%)	0.5
Readmission	3 (3.7%)	1 (2.4%)	1
Chronic groin pain	18 (26%)	6 (19%)	0.6
Recurrence	1 (1.3%)	0	1

Discussion

Groin hernia is a common pathologic entity, and its incidence is high in adults older than 65years. [16] Because life expectancy has dramatically increased (at present, it is slightly less than 80 years in developed countries, [17] the number of surgical procedures performed for hernia will most likely rise in the future. Further, geriatric patients who are candidates for herniorrhaphy often have concomitant diseases that increase both, the surgical and anaesthetic risks .[18] Cardiovascular, pulmonary, and urinary complications can occur after hernia surgery, especially if the procedure is performed under general or spinal anesthesia. [19] Conversely, patients who receive local anesthesia do not generally have serious intraoperative or postoperative complications. [20,21] Local anesthesia is also considered acceptable in terms of costs. Consequently, to increase safety and, if possible, to reduce costs, the surgical treatment of a common disorder such as groin hernia should be performed using surgical techniques that, proven to be effective, can be carried out under a local anesthesia. In keeping with this policy, nearly, all patients in this series underwent anterior tension-free proline mesh patch-plug hernia repair under local anesthesia, other surgical and anesthetic techniques were used only for incidental situations.

The rate of minor local complications was low, as was the recurrence rate, and there were no major general postoperative problems.

Since the introduction of the Bassini method in 1887, more than seventy types of tissue repair have been reported in the literatures. The majority of these repairs involved approximation of tissue under tension, resulting in unduly high recurrence rates . [22]

With the advent of the Lichtenstein repair, the trend has changed from a tissue repair to a tension-free repair during the last twenty years. Several randomized controlled trials have confirmed the efficacy of tension-free hernioplasty with mesh over Bassini and Shouldice repair . [23,24,25]

With more understanding of the inguinal anatomy, the concept of the myopectineal orifice has assumed significance. The myopectineal orifice, i.e. the area of the groin closed by the fascia transversalis with the inguinal canal above and femoral canal below is traversed by the inguinal ligament. The boundaries of the myopectineal orifice are superiorly the 'arch' of the transversus muscle, laterally the iliopsoas muscle, medially the rectus muscle and inferiorly the pectin of pubis. The myopectineal orifice represents a potential area of weakness in the abdominal wall and permits inguinal and femoral hernias to develop .The space is utilized in transabdominal , preperitoneal and total extraperitoneal laparoscopic approaches for the repair of inguinal and femoral hernias. A recent French study found that all 206 recurrences in their series were located at the myopectineal orifice and that the choice of mesh must take this into account. [26] Although currently several tension-free repairs are available (plug and patch onlay), the plug mesh design incorporates a circular preperitoneal layer, which is deployed from an anterior approach, protecting the internal ring, and finally an oval onlay sheet (patch), which addresses the posterior wall of the inguinal canal ,so it provides a coverage of the myopectineal orifice.

Two recent randomized controlled trials have compared the prolene hernia system mesh repair with the Lichtenstein repair, and one trial compared the prolene hernia system repair [13,27] with the mesh plug repair and Lichtenstein repair . [28] Nienhuijs et al [28] reported no significant difference in the postoperative pain and chronic groin pain between the two mesh repairs; however, the dimension of emotional quality of life after 3 months was worse in the Prolene Hernia System group compared with the Lichtenstein group . [13] Kingsnorth et al. [13] showed a shorter operative time with the plug and patch repair compared with the Lichtenstein repair. Similarly, immediate postoperative pain ,return to normal activity and work were shorter with the plug and patch repair compared to the Lichtenstein group .[27,29] This study did not reveal any significant differences between the two groups(local versus general anaesthesia) in regard to early postoperative outcomes and long-term groin pain and recurrence at the 4.5 year follow-up period .

Inguinal hernioplasty is one of the commonest operations performed in our community. The long waiting time for this operation puts a strain on our medical services and also increases the risk of the hernial obstruction or strangulation while waiting a list of elective surgery. This study showed that hernia repair under local anaesthesia was acceptable to the majority of patients presenting with inguinal hernia. The procedure was tolerated well. Only 11.3% had a mild discomfort.

Although there is enough evidence in the literatures that suggests that plug and patch repair is safe, easy to perform in the hands of both hernia specialists and general surgeons, there are minimal data comparing the plug and patch repair under local versus general anaesthesia. The current study has shown no significant differences between the two anaesthetic techniques with regard to early and long-term complications . However, a repair under local anaesthesia can facilitate increased day case repair.

The average period of post-operative analgesia was three hours. Most patients

felt that the subsequent pain was more tolerable because it came on gradually. This was consistent with the findings of Young , [28] in which patients operated upon under local anaesthesia had a lesser need for post-operative analgesia compared with those who had their surgery performed under general and spinal anaesthesias. The mean time required for the total surgical procedure including infiltration of local anaesthesia was 29.1 minutes. A good rapport was needed as the patient remained awake and was required to participate in the cough stress tests. The use of local anaesthesia would not appear to lengthen the intraoperative time. In fact, less time was spent in the operating suite compared with general and spinal anaesthesia which may require longer periods of patient monitoring . [10] This technique has been shown to result in a decrease in the hospital costs [9,10] and shorter elective waiting lists . [1,11]

The majority of the studies in the literatures analysing the plug and patch inguinal hernia repair under local anaesthesia have reported a small number of conversions to a repair under general anaesthesia because of patient discomfort .[30,31] This may be partly related to either paucity of local anaesthetic solution or a higher body mass index of the patients. The local anaesthetic mixture used in this study was a large-volume mixture which was further buffered with sodium bicarbonate to reduce the pain of infiltration. This large volume mixture facilitated a repair under local anaesthesia without conversion. Twenty one (25%) patients in the local anaesthetia group and twelve (27%) patients in the general anaesthetia group had a body mass index >30; however, no conversions were noted for these patients. The incidence of chronic groin pain in this study was slightly high; however, the majority of the patients had mild groin pain with no effect on day-to-day activities and quality of life. This reflects the high satisfaction rates with either technique.

Despite the fact that monitoring of physiologic variables has not been proved in randomized trials to reduce the number of serious events or complications, it is recommended by the ASA (American Society of Anaesthesia) for patients receiving sedative and analgesic medications .[4,32] As judged by the number of complications and cardiovascular and pulmonary events, patient safety was satisfactory with presence of relevant equipment and immediate access to anesthesia equipment and staffing.

Conclusion

Proline mesh (patch and plug) inguinal hernia repair under local anaesthesia resulted in increased day cases with similar complication rates compared to general anaesthesia. Both anaesthetic techniques were associated with good outcomes and excellent patient satisfaction.

We are aware that the numbers of patients in this study were few to assess long-term recurrence rates; however, the present study provides useful data comparing local and general anaesthesia for plug and patch repair. Furthermore, plug and patch repair under local anaesthesia resulted in increased day case rates with similar or less complication rates compared to general anaesthesia in addition to excellent patient satisfaction.

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