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Original Article

Early Results of Inguinal Hernia Repair under General Anesthesia and a One-Day Surgery Protocol

Methas Arunnart, MD

Department of Surgery, Songkhla Hospital, Songkhla, Thailand

Abstract

Objective: Several studies have shown that herniorrhaphy under general anesthesia (GA) could be done in a one-day surgery (ODS) setting. However, no studies have evaluated the outcomes and complications of this approach. We aim to evaluate the early outcomes of herniorrhaphy under GA in a ODS protocol.

Methods: Medical charts of patients who underwent herniorrhaphy between the years 2018 and 2022 were reviewed. Data on patient characteristics and early outcomes were collected. Patients with ASA class ≥ III, acute incarcerated hernia, strangulated hernia, and who did not have a good care provider were excluded.

Results: 100 patients underwent herniorrhaphy under GA in a ODS protocol. All patients were male. More than 50% of patients were between 41 to 60 years of age. The majority (71%) of cases had ASA class I. The average overall length of stay ± SD was 6.1 ± 0.3 hours.

Seven patients could not be discharged home on the same day due to urinary retention, surgeon's concern, severe postoperative pain, and dyspnea. The average length of stay in patients who needed post-operative admission was 21.6 ± 6.5 hours.

The overall complication rate was 9%. Urinary retention was the main complication and the main cause of postoperative admission. There were no deaths, readmissions, or early recurrent inguinal hernia.

Conclusion: Herniorrhaphy under GA was effective and safe and could be done within a ODS setting. The rate of complication was low. Urinary retention was the main complication causing failure to discharge on the same day. However, these complications were not a serious problem and patients could usually be discharged the next day.

Keywords: Inguinal hernia, Herniorrhaphy, Under general anesthesia, One day surgery

Introduction

Inguinal herniorrhaphy is one of the most commonly performed operations in the world.[1] In 2018, inguinal hernia surgery was included in the One Day Surgery (ODS) campaign according to a policy of the Ministry of Health of Thailand. The ODS campaign aimed to reduce crowding, decrease waiting time and increase accessibility of medical services and decrease the cost of medical care.[2]

Many hospitals preferred herniorrhaphy under local anesthesia (LA) within the ODS protocol because of safety concerns, and the low postoperative complications when compared with general anesthesia (GA).[3] Inguinal herniorrhaphy under LA in Thailand is being performed only in a few hospitals with a special interest in hernia repair, because herniorrhaphy under LA requires more skill and patience.[4]

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Corresponding author: Methas Arunnart, MD, Department of Surgery, Songkhla Hospital, Songkhla, Thailand, Email: methas.a@cpird.in.th; Telephone: +66 86 959 5449

Several studies have shown that herniorrhaphy under GA was safe and could be done as a one-day surgery.[5] However, no study has evaluated the outcomes of one-day herniorrhaphy under GA or its specific complications. This study aimed to evaluate the early outcomes of inguinal herniorrhaphy under GA in a ODS setting.

Patients and Methods

The present study was a retrospective descriptive study. Medical chart of patients who underwent herniorrhaphy over 5-year period, from 2018 to 2022 were reviewed. Six surgeons at Songkhla Hospital participated in the ODS protocol. Patients who received inguinal hernia repair under the ODS protocol were included, while excluding those who had ASA (American Society of Anesthesiologist) classes III or more, acute incarcerated hernia, strangulated hernia, and who did not have a good care provider.

In the ODS protocol, preoperative evaluation was done at a pre-anesthetic clinic before the day of surgery. Five surgeons performed herniorrhaphy under GA and one surgeon perform herniorrhaphy under GA combined with LA. Herniorrhaphy with the Lichtenstein technique was done in all patients. Patients were closely observed and discharged if no early postoperative complications were seen within 4 hours after surgery. Discharge criteria consisted of pain score less than 4, no wound bleeding/hematoma, no scrotal swelling, and no postoperative urinary retention.

All patients were prescribed Acetaminophen, Ibuprofen, Tramadol, and Milk of magnesia, if no contraindications exist. Nurses telephoned the patient to evaluate pain symptoms and detect early complications at 24 hours and 72 hours after discharge. Patients returned for follow-up at 2 weeks after the operation.

Data on patient characteristics were collected, which included ASA class, choice of anesthesia, hernia type, underlying disease, as well as the need for admission after surgery. Early outcomes occurring within 2 weeks after surgery were collected at the time of follow-up, including postoperative pain, wound infection, wound hematoma or seroma, urinary retention, complications from general anesthesia, and unplanned readmission.

The mean ± standard deviation (SD) was used to summarize continuous data such as the length of hospital stay, and counts and percentage was used to summarize categorical data such as postoperative complications.

Results

One hundred patients underwent herniorrhaphy under the ODS protocol. All patients were male. More than 50% of patients were between 41 to 60 years of age. The majority (71%) of cases had ASA class I. A vast majority of patients (94%) had a primary inguinal hernia. A few (3%) patients had bilateral inguinal hernias, and recurrent inguinal hernia was seen in 3% of cases (Table 1). Airway management during GA was achieved through an endotracheal tube in 93% of cases and a laryngeal mask airway in 7% of cases. Most patients underwent herniorrhaphy under GA (81%) and the rest underwent herniorrhaphy under GA combined with LA. Herniorrhaphy with the Lichtenstein technique was done in all patients. The average overall length of stay was 6.1 ± 0.3 hours.

Seven patients could not be discharged home on the same day. Two patients who had large inguinal hernias were admitted after surgery due to the surgeon's concern about wound complications. Three patients were admitted after surgery due to urinary retention, including one who had underlying benign prostatic hypertrophy.

Table 1 Patient characteristics (N = 100)

Characteristics	Number*
Age (years)	
< 2	3
21-40	16
41-60	56
61-80	23
> 80	2
Gender	
Male	100
Underlying disease	
Diabetes	6
Hypertension	19
Dyslipidemia	10
Benign prostate hypertrophy	4
Other	5
ASA	
I	71
II	29
Hernia type	
Primary inguinal hernia	94
Bilateral inguinal hernia	3
Recurrent inguinal hernia	3

*Counts and percentage are the same number

One patient had severe postoperative pain (pain score of 8) and was admitted after surgery, and one patient with underlying COPD had dyspnea and lung wheezing after extubation. The average length of stay in patients who required postoperative admission was 21.6 ± 6.5 hours.

The overall complication rate was 9% (Table 2), Seroma was seen in 3 patients, all of whom had large inguinal hernias, and one required reoperation. Urinary retention was seen in 4 patients. Three required urinary catheter placement and were admitted. Intermittent catheterization was done in one patient and was discharged on the same day. There were no deaths, readmissions, and no early hernia recurrence. No patient was loss follow-up in the present study.

Table 2 Early postoperative complications (N = 100)

Complication	Number*
Overall	**9**
Wound complication	
Small seroma	2
Seroma required reoperation	1
Urinary retention	4
Severe post-operative pain	1
Dyspnea after extubation	1

*Counts and percentage are the same number

Discussion

Inguinal hernia repair within an ODS setting was usually done under LA because of low postoperative complications and higher cost-effectiveness compared with inguinal hernia repair under GA.[4-11] However, many surgeons may not prefer repairing inguinal hernia under LA. At Songkhla Hospital, no surgeon wanted to repair inguinal hernias under LA. Previous studies have shown that inguinal hernia repair under GA was safe and could be done within a ODS setting. Therefore, at Songkhla Hospital inguinal hernia repair under GA using an ODS protocol was begun in 2018.

The technique of general anesthesia and herniorrhaphy under ODS was as same as in traditional care. In traditional care, patients remained in the hospital for 3 days and 2 nights, but in a ODS protocol, the length of stay was less than a day. Benefits of ODS include a reduction in crowding, a decrease in waiting time, increasing the accessibility of medical services and a decrease in the cost of medical care.[2]

In a previous study, the overall complication rates of herniorrhaphy were similar whether LA or GA was used, but urinary retention was significantly less with LA (OR = 0.13, $p < 0.001$).[3] Postoperative urinary retention (POUR) is a well-recognized complication of herniorrhaphy with reported incidence varying widely, ranging from 0.37 to 22%.[12]

POUR could be prevented by minimizing preoperative, intraoperative, and postoperative risk. Comorbidities frequently associated with POUR include renal failure, diabetes, and psychiatric illness.[13] Patients with untreated or undertreated benign prostatic hyperplasia are at increased risk. Those with voiding symptoms such as urgency, frequency, and nocturia are also at greater risk of developing POUR.[14] Several studies and meta-analyses have demonstrated the benefit of prescribing an alpha-blocker preoperatively and prophylactically in patients at greatest risk for POUR.[15]

Intraoperative risk factors for POUR include longer operative time, larger volumes of intraoperative intravenous fluid infusion, and type of anesthetic used. Operating time greater than 2 hours was a significant predictor of POUR.[16] Optimum intraoperative intravenous fluid volume management seems to decrease the incidence of POUR. Postoperative risk factors for POUR include a slow time to ambulation. One study demonstrated that early ambulation decreased the incidence of POUR from 52% to 19%.[17] Systemic opioids used postoperatively was also related to POUR.[18]

Wound hematoma and seroma are some of the most common complications of herniorrhaphy. Risk factors for hematoma or seroma include a large hernia defect, recurrent hernia, and use of anticoagulant and antiplatelet drugs.[19]

In the present study, patients were selected based on ASA classification. There was no documentation on the risk of wound complications and postoperative urinary retention. The number of postoperative admissions could be reduced if more stringent selection criteria were applied. However, postoperative admission was not a serious problem. Only 7% of patients required postoperative admission. All were discharged the next day, and readmission was seen. Postoperative seroma was detected

at 2 weeks in one patient, and surgical management was required. This complication was unrelated to the ODS protocol.

Limitations of the present study include the retrospective design of the study. Future prospective or randomized studies should be done to confirm the safety and outcome of herniorrhaphy under GA in a ODS protocol, compared with traditional care. Early outcomes in the present study were obtained within 2weeks after operation; however, complications occurring after 2 weeks or other longer-term outcomes should be similar to those of traditional care due to the technique of surgery being the same.

The results of the present study should inspire the confidence of surgeons to perform inguinal hernia repair under GA within a ODS protocol, and help increase the number of patients undergoing ODS in the future.

Conclusion

Herniorrhaphy under GA was safe and could be done within a ODS protocol. The rate of complications was low. Urinary retention was the main complication causing failure to discharge on the same day. However, these complications were not a serious problem, and patients could usually be discharged the next day.

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บทคัดย่อ **ผลลัพธ์ของการผ่าตัดไส้เลื่อนภายใต้การดมยาสลบแบบวันเดียวกลับ**

เมธัส อรัญนารถ, พ.บ.

กลุ่มงานศัลยกรรม โรงพยาบาลสงขลา

ความเป็นมา: การผ่าตัดไส้เลื่อนขาหนีบ เป็นหนึ่งในการผ่าตัดที่พบบ่อยที่สุดในโลก หลายโรงพยาบาลนิยมผ่าตัดไส้เลื่อนแบบวันเดียวกลับโดยใช้ยาชาเฉพาะที่ เนื่องจากปลอดภัยและมีภาวะแทรกซ้อนน้อยกว่าการดมยาสลบ มีหลายการศึกษาที่กล่าวถึงการผ่าตัดไส้เลื่อนโดยใช้ยาสลบนั้นสามารถทำแบบผ่าตัดวันเดียวกลับได้ แต่ยังไม่มีการศึกษาใดที่ศึกษาถึงความปลอดภัยและข้อควรระวังเกี่ยวกับภาวะแทรกซ้อนอย่างเฉพาะเจาะจง

วัตถุประสงค์: เพื่อศึกษาผลลัพธ์ระยะสั้นของการผ่าตัดไส้เลื่อนแบบวันเดียวกลับภายใต้การดมยาสลบ

วิธีการศึกษา: เป็นการศึกษาแบบเก็บข้อมูลย้อนหลัง โดยการนำเวชระเบียนของผู้ป่วยที่ได้รับการผ่าตัดไส้เลื่อน ในช่วงเวลา 5 ปี (พ.ศ. 2561-2565) มาทำการรวบรวมข้อมูลพื้นฐานและผลลัพธ์ระยะสั้นทางคลินิก เกณฑ์คัดเข้า คือ ผู้ป่วยที่ได้รับการผ่าตัดไส้เลื่อน เกณฑ์คัดออก ได้แก่ ผู้ป่ วยที่มี ASA class ≥ III มีภาวะไส้เลื่อนติดคาฉับพลัน (Acute incarcerated hernia) มีไส้เลื่อนร่วมกับลำไส้ขาดเลือด (Strangulated hernia) และไม่มีผู้ดูแลที่ดี

ผลการศึกษา: ผู้ป่วย 100 ราย ได้รับการผ่าตัดไส้เลื่อนแบบวันเดียวกลับภายใต้การดมยาสลบ โดยผู้ป่วยทั้งหมดเป็นเพศชาย ส่วนใหญ่อายุอยู่ในช่วง 41-60ปี ร้อยละ 71 ของผู้ป่วย มี ASA class I และ มีค่าเฉลี่ยระยะเวลานอนโรงพยาบาลโดยรวม คือ 6.12 ± 0.27 ชั่วโมง

ผู้ป่วย 7 ราย ไม่สามารถกลับบ้านได้ในวันที่ผ่าตัด เนื่องจากภาวะปัสสาวะไม่ออก ความกังวลของศัลยแพทย์ อาการปวดแผลอย่างรุนแรง และอาการหอบเหนื่อย ระยะเวลานอนโรงพยาบาลโดยเฉลี่ยของผู้ป่วยกลุ่มนี้ คือ 21.56 ± 6.48 ชั่วโมง พบภาวะแทรกซ้อนโดยรวม ร้อยละ 9 โดยมีภาวะปัสสาวะไม่ออก เป็นภาวะแทรกซ้อนที่พบมากที่สุดและเป็นสาเหตุหลักที่ทำให้ต้องนอนโรงพยาบาลหลังผ่าตัด ไม่มีผู้ป่วยเสียชีวิต กลับเข้ามานอนโรงพยาบาลซ้ำ หรือกลับมาเป็นไส้เลื่อนซ้ำ

สรุปผลการศึกษา: การผ่าตัดไส้เลื่อนแบบดมยาสลบ มีความปลอดภัย และสามารถทำผ่าตัดแบบวันเดียวกลับได้ ภาวะแทรกซ้อนต่ำ โดยมีภาวะปัสสาวะไม่ออก เป็นภาวะแทรกซ้อนหลัก ที่ทำให้ผู้ป่วยไม่สามารถกลับบ้านในวันที่ผ่าตัดได้ อย่างไรก็ตาม ภาวะแทรกซ้อนเหล่านี้ ไม่ได้มีความรุนแรงและผู้ป่วยมักจะกลับบ้านได้ในวันรุ่งขึ้น