Predictors of Post-Operative Length of Stay After Robotic TAPP Inguinal Hernia Repair

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Abstract

Postoperative urinary retention (POUR) is a common complication in transabdominal preperitoneal (TAPP) inguinal hernia repair, an otherwise well-tolerated outpatient procedure. Investigating and targeting factors related to POUR may lead to decreased PACU LOS, unplanned admissions, and peri-procedural costs. One of the potential factors is the use of Sugammadex as a paralytic reversal agent, resulting in decreased use of anti-cholinergic reversal agents.

We performed a retrospective observational review study at a single 625 bed community based hospital. Patients who underwent rTAPP inguinal hernia repairs between January 2018 and December 2019 were studied. Data points collected included patient factors of sex, age, race, BMI and procedural factors of intraop Foley, unilateral vs bilateral repair, choice of paralytic reversal agent, use of regional anesthesia, and surgery duration. Primary outcome measured was PACU LOS. Multivariate analysis was performed.

A total of 491 patients met inclusion criteria. Median LOS was 326 minutes. The two factors correlating with PACU LOS were intraop Foley (p = 0.015) and performance of bilateral repair (0.001). Consideration should be used in the practice of TAPP inguinal hernia repairs on whether or not routine utilization of intraoperative Foley is justifiable.

Introduction

Minimally invasive transabdominal preperitoneal (TAPP) inguinal hernia repair is performed as a well-tolerated outpatient procedure. However, common complications including postoperative urinary retention (POUR) and pain can result in extended PACU length of stay (LOS), unplanned admission rates, and overall increased peri-procedural costs. There are several potential factors contributing to POUR after TAPP. Dissection of the myopectineal orifice can cause neuropraxia of the bladder. Furthermore, anti-cholinergic reversal agents can promote urinary retention, by inhibition of the detrusor muscle. POUR results in need for Foley catheterization, prolonged PACU length of stay and increased incidence of unplanned admission.

Investigating predictors of extended PACU stay may highlight targetable areas of improvement in peri-procedural protocols. One of the potential factors is the use of Sugammadex as a paralytic reversal agent, resulting in decreased use of anti-cholinergic reversal agents and in turn, decreased rates of POUR. Increasing use of Sugammadex, the first selective relaxant binding agent (SRBA), may contribute to decreased POUR by avoiding the systemic anticholinergic side affects associated with traditional reversal agents ie glycopyrrolate and neostigmine.

Methods and Materials

We performed a retrospective observational study, reviewing all patients at a single 625 bed community-based hospital undergoing robotic TAPP inguinal hernia repairs between January 2018 and December 2019. The study population included patients from 9 robotic surgeons.

Data points collected including patient sex, age, race, BMI. Procedure specific data included intraoperative placement of a foley, unilateral vs bilateral repair, paralytic reversal agents, local/regional anesthetic type and dose, and duration of surgery. The primary outcome measured was PACU LOS. A multivariate analysis was performed to determine which factors had a significant correlation with increased PACU LOS.

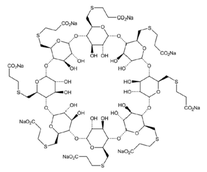


Figure 1. Sugammadex, a cyclodextrin, is used for reversal of neuromuscular blockade by selectively binding the rocuronium molecule

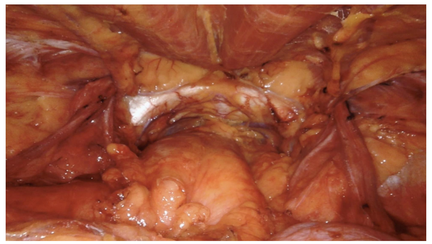


Figure 2. Myopectineal orifice dissection in rTAPP inguinal hernia repair.

Results

We identified a total of 491 patients meeting inclusion criteria. The data collected over 2 years included cases from 9 different surgeons, with 491 patients. 90% of the patients were male. The average patient age was 63, and average BMI was 25.6. The median length of stay following surgery was 326 minutes (25%-75% IQR: 277 -417).

Of the variables studied, only intraoperative use of a Foley and bilateral hernia repair significantly increased the time spent in the PACU. Patients undergoing a bilateral repair spent 134 minutes longer in the hospital postoperatively than those who underwent unilateral repair. Patients who received Foley catheterization intraoperatively spent 93 minutes longer in the hospital postoperatively.

	N=491		P-value
Male (%)	444 (90)		0.654
Average Age (SD)	63 (14)		0.268
Average BMI (SD)	25.6 (3.7)		0.234
Intraop Foley (%)	184 (37)		0.015*
Intraop Glycopyrrolate (%)	102 (21)		0.883
Regional Anesthesia (%)	332 (68%)		0.233
Adj. mL of Local (SD)	32 (21)		0.355
Bilateral repair (%)	193 (39)		0.001*
Sugammadex reversal (%)	466 (95)		0.688

Table 1. Results. Patient/Procedural factors that were significantly correlated with PACU length of stay (with p-value cutoff set at 0.05) were 1) intraoperative use of Foley catheter and 2) performance of bilateral as opposed to unilateral inguinal hernia repair.

Discussion

This single-center retrospective observational study identified intraoperative Foley usage and the performance of bilateral, rather than unilateral, repairs as statistically significant risk factors for extended hospital stay after robotic TAPP inguinal hernia repairs. Bilateral hernia repair likely extended length of stay due to increased pain and debility, but the cost of this must be weighed against the cost of two separate procedures. The intraoperative Foley may be due to increased time to first spontaneous void due to completely emptying the bladder, and may also be correlated with patients who have BPH and thus have greater difficulty voiding prior to discharge.

Of 491 patients undergoing robotic inguinal hernia repair only 9 required postoperative catheterization. Thus, the standard postoperative protocol of awaiting trial of void after minimally invasive IHR may be unnecessary, subverting the need for prolonged observation and associated costs. This suggests an area of future investigation in the management of post-operative trial of void in minimally invasive inguinal hernia repairs.

Conclusions

The standard postoperative protocol of awaiting trial of void after minimally invasive IHR may be unnecessary, subverting the need for prolonged observation and associated costs. This suggests an area of future investigation in the management of post-operative trial of void in minimally invasive inguinal hernia repairs.

References

1. Scheuermann U, Niebisch S, Lyros O, Jansen-Winkeln B, Gockel I. Transabdominal Preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair - A systematic review and meta-analysis of randomized controlled trials. BMC Surg. 2017 May 10;17(1):55. doi: 10.1186/s12893-017-0253-7. PMID: 28490321; PMCID: PMC5424320.
2. HerniaSurge Group. International guidelines for groin hernia management. Hernia. 2018 Feb;22(1):1-165. doi: 10.1007/s10029-017-1668-x. Epub 2018 Jan 12. PMID: 29330835; PMCID: PMC5809582.
3. Podolsky D, Novitsky Y. Robotic Inguinal Hernia Repair. Surg Clin North Am. 2020 Apr;100(2):409-415. doi: 10.1016/j.suc.2019.12.010. Epub 2020 Feb 1. PMID: 32169186.
4. Hawkins J, Khanna S, Argalious M. Sugammadex for Reversal of Neuromuscular Blockade: Uses and Limitations. Curr Pharm Des. 2019;25(19):2140-2148. doi: 10.2174/1381612825666190704101145. PMID: 31272347.
5. Isik Y, Palabiyik O, Cegin BM, Goktas U, Kati I. Effects of Sugammadex and Neostigmine on Renal Biomarkers. Med Sci Monit. 2016 Mar 10;22:803-9. doi: 10.12659/msm.897608. PMID: 26963316; PMCID: PMC4791087.
6. Blair AB, Dwarakanath A, Mehta A, et al. Postoperative urinary retention after inguinal hernia repair: a single institution experience. Hernia. 2017;21(6):895-900. doi:10.1007/s10029-017-1661-4
7. Cha J-E, Park SW, Choi YY, et al. Sugammadex use can decrease the incidence of post-operative urinary retention by avoiding anticholinergics: a retrospective study. Anesth Pain Med. 2018;13(1):40-46. doi:10.17085/apm.2018.13.1.40
8. Denham M, Donovan K, Wetoska N, et al. Effects of dexamethasone on postoperative urinary retention after laparoscopic inguinal hernia repair. Surgical Endoscopy. September 16, 2018.
9. Hall BR, Armijo PR, Grams B, Lomelin D, Oleynikov D. Identifying patients at risk for urinary retention following inguinal herniorrhaphy: a single institution study. Hernia. 2019;23(2):311-315. doi:10.1007/s10029-018-1829-6
10. SOgün C, Cakan T, Baltacı B, Başar H. Comparison of reversal and adverse effects of sugammadex and combination of - Anticholinergic-Anticholinesterase agents in pediatric patients. J Res Med Sci. 2014;19(8):762-768. http://www.ncbi.nlm.nih.gov/pubmed/25422663. Accessed April 18, 2019.
11. Scott AJ, Mason SE, Langdon AJ, et al. Prospective Risk Factor Analysis for the Development of Post-operative Urinary Retention Following Ambulatory General Surgery. World J Surg. 2018;42(12):3874-3879. doi:10.1007/s00268-018-4697-4

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