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Original Research Paper

Surgery

ROBOTIC RETRO RECTUS MESH REPAIR OF VENTRAL ABDOMINAL HERNIA – AN INSTITUTIONAL EXPERIENCE

Arundev R	Department of General Surgery, All India Institute of Medical Sciences, Rishikesh.
Durga Sowmya S	Department of General Surgery, All India Institute of Medical Sciences, Rishikesh.
Farhanul Huda*	MS, FACS, DipMAS, Additional Professor, Department of General Surgery, All India Institute of Medical Sciences, Rishikesh. *Corresponding Author

ABSTRACT Ventral hernia is a common condition treated by general surgeons. Open ventral mesh hernia repair has been in practice; the high failure rates have led to the rise of minimally invasive techniques. The da Vinci robot-assisted repair is a minimally invasive technique that provides an advantage of three-dimensional imaging, precise suturing, and dissection at difficult angles. In this study, we share our experience of robot assisted retro rectus ventral hernia repair (RRVH) in four patients. Retro rectus mesh placement has the advantage of fewer chances of exposure of the mesh and a low operative cost, as polypropylene mesh can be used. Of the four patients, 3 were females, and one was male with a mean age of 46.5±6.5 SD. The mean operative time was 175±28.7 minutes for skin-to-skin completion and 151.25 ± 26.07 minutes for console duration. There were no intra-operative complications. Post-operatively, the average pain score on the day of surgery was 1.75±0.43 SD (on a scale from 0 to 10) and on the first postoperative day was 0.5 ± 0.5 SD. The average length of hospital stay was 2.25±0.43 SD days. None of the patients had seroma, surgical site infection, adhesive bowel obstruction, or recurrence of hernia on one month and six months follow up. RRVH has an advantage regarding the decreased postoperative pain and early return to daily activities. This technique promotes the usage of polypropylene mesh, which reduces the cost of surgery.

KEYWORDS : ventral hernia; robotic; robotic surgery; retrorectus; robotic assisted

INTRODUCTION:

Ventral hernia repair is a common procedure done by general surgeons. Incisional hernia, a complication of open abdominal surgery, is the most common ventral hernia. Its incidence varies from 2-20%. (1) With an increase in the number of surgeries, there is a concurrent increase in the incidence of incisional hernias. Factors contributing to the occurrence of incisional hernia are wound infection, obesity, immunosuppression. Various techniques of open ventral hernia repair have been described. However, the failure rate of these techniques is high (12-24%), with an increased incidence of wound and mesh-related complications. (2) Minimally invasive procedures like intraperitoneal onlay mesh repair (IPOM), totally extraperitoneal repair (TEP), and the enhanced view totally extraperitoneal repair (eTEP) are in practice. (3) Recently Robot-assisted ventral hernia repair is being ventured, owing to the better ergonomics which would enable a more effective repair. The da Vinci robot-assisted repair provides an advantage of three-dimensional imaging, precise suturing, and dissection at difficult angles. (4) Retrorectus mesh placement is a more physiological way of strengthening the anterior abdominal wall. The additional advantages include fewer chances of exposure of the mesh and a low operative cost as polypropylene mesh can be used. (5) We present a case series of four patients who underwent Robot-assisted retrorectus ventral hernia repair (RRVH) at our institute. It aims at exploring the safety, feasibility, and postoperative complications of RRVH.

METHODS:

Study Population and Design

Data of four patients who underwent RRVH in AIIMS Rishikesh between January 2020 and March 2020 were prospectively maintained.

Patient data, such as demographics (age, sex), comorbidities, and BMI, were recorded. Physical examination of the patients was done to identify the location, number, and size of the hernia site pre-operatively. Operative time in minutes with a special note on skin-to-skin time (time from the first incision to completed skin closure) and console time, type, and size of the mesh used were noted.

Postoperative pain scoring was done using a numerical scale ranging from 0 to 10 (0 being no pain to 10 being the worst pain). Pain scoring was done on the night of surgery and POD-1. Length of hospital stay was calculated from the day of surgery to the day of discharge. Postoperative complications were classified according to Clavien-Dindo classification system. (6)

Suture removal was done on the 10th postoperative day during the outpatient visit.

Patients were followed up at one month and 6 months after surgery for clinical examination.

Surgical Technique

Under general anesthesia, the patient was positioned supine, head down with arms by the side. Pneumoperitoneum was created using a Verres needle. Port placement was done according to the hernia site. Camera was introduced through the port and the hernia site identified. Xi Da Vinci robotic platform was then docked, and targeting of the hernia site was done. The hernia was identified, and contents reduced. Retro rectus space was entered by incising peritoneum and posterior rectus sheath (Figure 1). Dissection in retro rectus space was done, creating a 5-8 cm working space all around the hernia defect. Primary repair of the hernia defect was done using 2-0 barbed sutures (Figure 2). Mesh was placed in the created retro rectus space and fixed to the anterior abdominal wall using sutures. Posterior rectus sheath and peritoneum were closed together using absorbable sutures. The robotic platform was then undocked, pneumoperitoneum was released under direct vision, and port site closure was done.

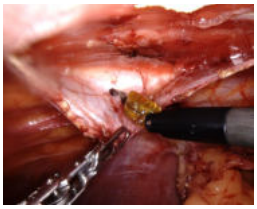

Figure 1: Peritoneal reflection 5 cm proximal to the hernia site

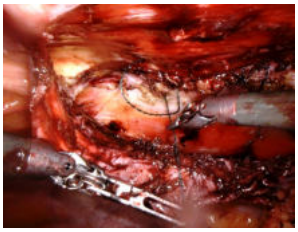

Figure 2: Primary repair of the hernia defect

STATISTICAL ANALYSIS

Categorical variables were represented as frequency (n (%)), and continuous variables were expressed as arithmetic mean.

RESULTS

Of the four patients, 3 were females, and one was male with a mean age of 46.5±6.5 SD and mean BMI of 29.17±1.46 SD, and only one patient had comorbidities (hypertension and hypothyroidism). Two of the patients had a history of open mesh repair of hernia, which recurred (Table 1).

Table 1: Patient details

Diagnosis	Recurrent Umbilical Hernia	Epigastric Hernia	Recurrent Incisional Hernia	Umbilical Hernia
Age	38	44	48	56
Sex	F	F	F	M
BMI	27.7	31.6	28.9	28.5
Co-Morbidities	NIL	HTN, Hyperthyroidism	NIL	NIL
Previous Surgery	2014 – Mesh repair of Umbilical Hernia (? IPOM)	NIL	2005 – Abdominal Hysterectomy 2012 – Open Incisional Hernia Mesh Repair	NIL
Duration of Hospital Stay	2	2	2	3

All hernias were uncomplicated, solitary hernias with a mean defect size of 10.75±5.44 cm2. The location was epigastric in one patient, umbilical in two patients (of which one was recurrent), and recurrent post-cesarean section incisional hernia.

The mean operative time was 175±28.7 minutes for skin-to-skin completion and 151.25 ± 26.07 minutes for console duration. There were no intra-operative complications. 15X15 cm Polypropylene Mesh was used in all cases (Table 2).

Table 2: Intraoperative characteristics

Diagnosis	Recurrent Umbilical Hernia	Epigastric Hernia	Recurrent Incisional Hernia	Umbilical Hernia
Hernia Size	6 cm^2	8 cm^2	20 cm^2	9 cm^2
Number of Defects	Single	Single	Single	Single
Mesh	Prolene	Prolene	Prolene	Prolene
Mesh Size	15x15 cm	15x15cm	15x15cm	15x15cm
Console Time	160min	125 min	190 min	130 min
Skin to Skin time	180 min	150 min	220 min	150 min
Intra op Complications	NIL	NIL	NIL	NIL

Post-operatively, the average pain score on the day of surgery was 1.75±0.43 SD (on a scale from 0 to 10) and on the first postoperative day was 0.5 ± 0.5 SD. There were no complaints of nausea or vomiting, or urinary retention in the postoperative period. The average length of hospital stay was 2.25±0.43 SD days (Table 3).

Table 3: Post operative pain and complications

Diagnosis	Recurrent Umbilical Hernia	Epigastric Hernia	Recurrent Incisional Hernia	Umbilical Hernia
Age/Sex	38/F	44/F	48/F	56/M
Pain(VAS) on POD-0	2	2	1	2
Pain(VAS) on POD-2	0	0	0	1
Nausea and Vomiting	NIL	NIL	NIL	NIL
Urinary Retention	NIL	NIL	NIL	NIL
Edema	NIL	NIL	NIL	NIL
Seroma	NIL	NIL	NIL	NIL
SSI/ wound infection	NIL	NIL	NIL	NIL
Adhesive bowel obstruction	NIL	NIL	NIL	NIL
Recurrence	NIL	NIL	NIL	NIL

None of the patients had seroma, surgical site infection, adhesive bowel obstruction, or recurrence of hernia on one month and six months follow up. None of the patients required re-admission.

DISCUSSION

Hernias of the ventral abdominal wall are non-hiatal non-inguinal herniation of intra-abdominal contents (7). Various techniques have been defined for the surgical repair of ventral abdominal hernias, of which retro-rectus mesh repair has distinct advantages such as the mechanical advantage of placing the mesh in retro rectus position, which allows for usage of relatively less expensive polypropylene mesh as well as decreased chance for adhesions (5).

Robotic hernia repair has become popular due to the increased range of motion made possible by the wristed devices and better visualization and easier separation of the anterior abdominal wall components. (4)

We started our RRVH program in January 2020. We aimed to evaluate the procedures done until now and follow up with the patients who underwent the procedure to improve the program further. We want to share our initial learning experience.

The skin-to-skin operative time was 175±28.7 minutes was higher than 141 min for RRVH as reported by Oscar A Olavarria et al. (8), which can be attributed to the initial learning phase in our institute.

This technique allows the usage of polypropylene mesh as the posterior rectus sheath and peritoneum are present between the bowel and the mesh, which prevents adhesions and fistula formation. (9) There were no intra-operative complications in any of the surgeries that demonstrate the safety of robotic devices. It may also be attributed to the cautious approach in the learning curve phase. In 2020, Millard et al. (10) reported that 40% of the patients who underwent open repair for primary ventral hernia and 80% of the patients who underwent open incisional hernia repair required opioid analgesia on first and second postoperative days. In a prospective study comparing the effect of sutures vs. tacks on postoperative pain after laparoscopic ventral hernia repair, 41% of the patients in the sutures group and 38% of the patients in the tacks group required postoperative opioid analgesia (11). In this study, Postoperative pain was less and was managed by oral NSAIDs, and none of the patients required opioid medications. This allows for early ambulation and better quality of life post-surgery.

One advantage of minimally invasive surgery is that most patients can be discharged on the day of surgery. (12) However, our patients had a longer length of stay at the hospital due to the apprehensiveness of patients considering the difficulty in access to transportation to get back to their home in hilly areas. Heniford et al. (12) in 2003 published their experience of laparoscopic ventral hernia repair in 850 patients. They reported 128 complications in 112 patients, of which the most common complication was ileus and prolonged seroma. Patients were on follow-up for six months and there were no postoperative complications that re-affirm the technique's adequacy.

The study's limitations include the low sample size, which resulted in a non-normal distribution of the data. The limited number of patients can be attributed to the initial learning phase of the RRVH program at our institute and the temporary suspension of the elective OT's because of the ongoing Covid-19 pandemic. Another limitation is the lack of assessment of patients' quality of life, which would have given a better overall view of post-surgical complications.

CONCLUSION

The RRVH has an advantage with regard to the decreased postoperative pain and early return to daily activities. However, we need to reduce the operative time without compromising the safe and careful approach, which will reduce the surgical stress on patients. This technique promotes the usage of polypropylene mesh, which helps in reducing the cost of surgery. It enables early discharge. The addition of an assessment of the quality of life while collecting data will help understand the surgery's overall outcome.

REFERENCES

1. Le Huu Nho R, Mege D, Ouaïssi M, Sielezneff I, Sastre B. Incidence and prevention of ventral incisional hernia. Journal of Visceral Surgery. 2012;149:3-14.
2. Misiakos EP, Machairas A, Patapis P, Liakakos T. Laparoscopic ventral hernia repair: pros and cons compared with open hernia repair. JSLS. 2008;12(2):117-125.
3. Mitura K. New techniques in ventral hernia surgery - an evolution of minimally-invasive hernia repairs. Pol Przegl Chir. 2020 Aug 31;92(4):38-46.
4. Kudsi OY, Paluvoi N, Bhurtel P, McCabe Z, El-Jabri R. Robotic Repair of Ventral Hernias: Preliminary Findings of a Case Series of 106 Consecutive Cases. Am J Robot Surg. 2015;2(1):22-26.
5. Earle D. Robotic-Assisted Laparoscopic Ventral Hernia Repair. Surg Clin North Am. 2020 Apr;100(2):379-408.
6. Dindo D, Demartines N, Clavien PA. Classification of surgical complications: a new proposal with evaluation in a cohort of 6336 patients and results of a survey. Ann Surg. 2004 Aug;240(2):205-13.
7. Smith J, Parmely JD. Ventral Hernia. [Updated 2020 Aug 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK499927/
8. Olavarria OA, Bernardi K, Shah SK, Wilson TD, Wei S, Pedroza C, et al. Robotic versus laparoscopic ventral hernia repair: Multicenter, blinded randomized controlled trial. BMJ 2020;370:m2457.
9. Jani, Kalpesh, and Samir Contractor. "Retrorectus sublay mesh repair using polypropylene mesh: Cost-effective approach for laparoscopic treatment of ventral abdominal wall hernias." Journal of minimal access surgery. 2019;15(4): 287-292.
10. Millard JL, Moraney R, Childs JC, Ewing JA, Carbonell AM, Cobb WS, Warren JA. Opioid Use After Inguinal and Ventral Hernia Repair. Am Surg. 2020 Aug;86(8):965-970.
11. Nguyen SQ, Divino CM, Buch KE, et al. Postoperative pain after laparoscopic ventral hernia repair: a prospective comparison of sutures versus tacks. JSLS. 2008;12(2):113-116.
12. Heniford BT, Park A, Ramshaw BJ, Voeller G. Laparoscopic repair of ventral hernias: nine years' experience with 850 consecutive hernias. Ann Surg. 2003;238(3):391-400.