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# MULTICENTRIC AUDIT OF LAPAROSCOPIC HYSTERECTOMY AND IT'S COMPLICATIONS PERFORMED BY A SINGLE SURGEON OVER A DURATION OF 14 YEARS

Gynaecology

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## ABSTRACT

**Objective:** To assess the techniques and complications of laparoscopic hysterectomy performed by a single surgeon and comparing it to standard guidelines.
**Design:** Clinical audit
**Setting:** Multicentric study
**Patients:** All patients undergoing hysterectomy during the period from October 2003 to September 2017.
**Results:** A total of 450 patients were included in the analysis. Maximum patients were in the age group of 40-50 years (260/450). Most common indication for hysterectomy was abnormal uterine bleeding (196/450) followed by leiomyomas (174/450). Conversion rate to laparotomy was 3.3%, bladder injury 0.89% and ureter injury 0.004%.
**Conclusion:** Total laparoscopic hysterectomy when performed by a trained and experienced surgeon in a good hospital set up offers minimal complication rates and shorter postoperative hospital stay.
**Background and aim:** This audit was done on 450 patients who booked themselves for laparoscopic hysterectomy and had the surgery performed during the duration of fourteen years (October 2003 to 30th September 2017) in different institutes but by the same surgeon. Our aim was to adhere to recent evidence produced by the literature showing significant benefits of laparoscopic techniques for hysterectomy compared to the conventional 'open' approach. Benefits include decreased blood loss, shorter hospital stay, improved recovery and earlier return to normal activities with less abdominal wall infections.
With regard to NICE guidelines 2007(1) our aim is:
1. All surgeons should have advanced laparoscopic skills – target 100%
2. Conversion to laparotomy should be <7%
3. Urinary tract injuries should be less than 1%

## KEYWORDS

### Introduction

Hysterectomy is one of the most commonly performed surgical procedures. Hysterectomy is performed for a variety of benign conditions that have not responded to conservative management, including heavy menstrual bleeding, symptomatic uterine fibroids, chronic pelvic pain and uterine prolapse. Hysterectomy is also performed for cancer of the uterus (including cervical cancer) and ovaries.[1]

A conventional "open" hysterectomy involves removal of the uterus through an abdominal or a vaginal approach. In total laparoscopic hysterectomy(TLH) and laparoscopic supracervical hysterecto my(LSH), the entire procedure is performed laparos copically, including division of the uterine vessels. In TLH the cervix is removed, while in LSH it is left in situ. In laparoscopic assisted vaginal hysterectomy (LAVH) and laparoscopic hysterectomy(LH), part of the operation is performed laparoscopically and part vaginally. Uterine vessel division is performed vaginally in LAVH and laparoscopically in LH.[1]

**TABLE 1. AAGL Classification system for laparoscopic hysterect omy [2]**

| | |
|---|---|
| TYPE O | Laparoscopic directed preparation for vaginal hysterectomy |
| TYPE I | Occlusion and division of at least one ovarian pedicle, but not including uterine artery(ies) |
| TYPE II | Type I plus occlusion and division of the uterine artery, unilateral or bilateral |
| TYPE III | Type II plus a portion of the cardinal-uterosacral ligament complex, unilateral or bilateral |
| TYPE IV | Complete detachment of cardinal-uterosacral ligament complex, unilateral or bilateral, with or without entry into the vagina |

When compared with abdominal hysterectomy (AH) and laparascopic-assisted vaginal hysterectomies (LAVH), TLH has been reported to result in shorter procedure durations[3], lower blood losses[4], and shorter hospital stays[4]. Typically vaginal hysterect omy(VH) and LAVH are performed in patients with at least moderate prolapse usually associated with parity, but some of these patients may later develop vaginal prolapse or incontinence[5].

Reported overall complication rates range from 0.2% and 10.3%[7]. Major laparoscopic procedures are associated with a higher rate of complications compared with minor procedures, 0.6% to 18% and 0.06% to 7.0%, respectively[6]. Because some complications result from more than one cause, clear classification of complications is challenging. Complications include abdominal wall vascular injury, intestinal injury, ureteral injury, bladder injury, major vascular injury, hernia at trocar site, subcutaneous emphysema, hypercarbia, cardiac arrhythmia, pneumothorax/pneumomediastinum and port site metastasis.

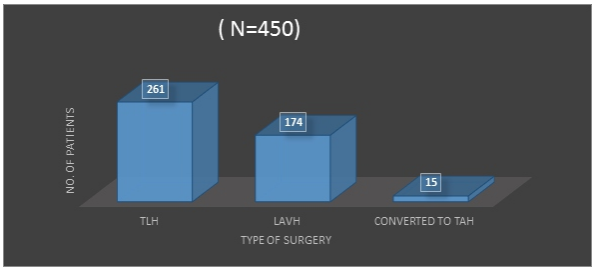
Hence, this audit was done to review the safety and efficacy of total laparoscopic hysterectomy by analysing the patient factors, indications, complications and postoperative hospital stay in all the patients who underwent laparoscopic hysterectomies in the duration of almost 14 years in multiple institutes but operated upon by the same surgeon.

### Method

A retrospective review of all cases of laparoscopic including laparoscopic assisted vaginal hysterectomy (LAVH) and total laparoscopic hysterectomy (TLH) performed by a single surgeon at various institutes during the duration of 14 years (from 2003 to September 2017) was done. Patient data was collected retrospectively from the surgeon's private records and patient records section. Patient demographics, indications for the procedure, intraoperative and postoperative complications were recorded and analysed.

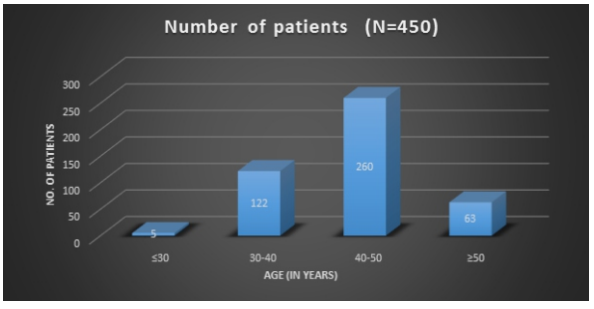
**Laparoscopic methods used:**

**1. Total laparoscopic hysterectomy (TLH)**: The uterus and cervix is totally dissected laparoscopically and removed either through the abdominal wall with a morcellator or vaginally.
**2. Laparoscopic assisted vaginal hysterectomy (LAVH):** Comprises of an initial laparoscopic phase involving dissection of the uterus above the uterine vessels followed by a vaginal phase.

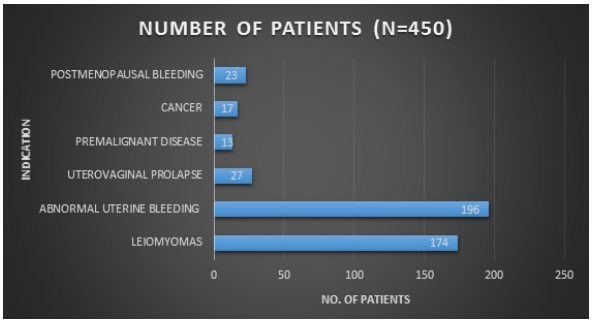



**Number of laparoscopic hysterectomies performed over during a 15 year period (2003-2017)**

| Complications | Standards or expected rate (referenced sources) | Audit |
|---|---|---|
| Conversion to laparotomy | 2-7% | 3.3% |
| Bladder injury | <1% | 0.89% |
| Ureter injury | <1% | 0.004% |
| Bowel injury | <1% | 0% |
| Return to theatre (any cause) | <3% | 0% |




**Age distribution of the patients**




**Patients' indications**

**Discussion**

In this study, all the factors taken into account reflect a broad diversity of consecutive patients and demonstrate a broad utility for TLH. The number of women who underwent hysterectomy was maximum in the 40-50 years age group (260/450 or 57.8%) and the most common indication was abnormal uterine bleeding. The complication rate of 3.3% in this series are comparable to rates in other TLH series [7-9]. Hoffman et al [7] had a total complication rate of 10%, while Heinberg et al [8] had a complication rate of 14.4% and Chapron[9] reported complications in 10%.

Six patients in our study had urological injury including four bladder injuries and two ureter injuries. Two patients had ureteric injury during dissection in a case of severe endometriosis. Laparotomy was done followed by re-implantation with D-J stenting. Katherine et al [16] reported urological injury in 2.3% (19 out of 830 patients), with half requiring reoperation: 3 cystoscopic ureteral stent placements, 4 ureteral reimplantations, and 2 laparatomies for closure of bladder fistula. Brummer et al [10] also reported that this incidence decreased from 1.4% to 0.7% between 2000 and 2005. Of all urinary injuries, 64.7% occurred with laparoscopic- assisted vaginal hysterectomy, 18.0% during operations for endometriosis, and 12.3% during diagnostic or sterilization procedures.[11]

Pelvic surgery is the most common cause of iatrogenic ureteral injury. It is becoming more common as a result of the increasing number of laparoscopic hysterectomies and retroperitoneal laparoscopic procedures that are being performed. The majority of patients with ureteral injuries have no identifiable predisposing risk factors. Estimated incidence of ureteral injury during laparoscopic hysterectomy is 2.6 to 35 times more common (0.2% to 6.0%) than in abdominal hysterectomy [12]. Ureteral injury accounted for 4.3% to 7% of the total laparoscopy complications [13,14]. Overall ureteral injuries were identified with incidence rates ranging from 0.025% to 2% [14,15]

Laparoscopic repair is frequently used in cases recognized intraoperatively, while the laparotomic approach is performed in patients diagnosed postoperatively. Focal ureteral injuries can be treated using a double J-shaped catheter allowing for spontaneous healing. However, more extensive damage may require laparotomy to perform an end-to-end anastomosis or ureteral implantation. In delayed recognition of ureteral injury, initial treatment with ureteral stenting may not be useful, and early open repair (ureteral reconstruction, ureteroneocystostomy) for these injuries is advocated. Two patients had bladder injury in cases of multiple fibroids in the uterus involving the cervical region. In other two patients, with a history of previous C-sections, bladder was densely adhered to the uterus and was injured during dissection. In first two cases, laparotomy had to be done for completion of hysterectomy and repair of bladder rent but in the other two bladder was repaired laparoscopically.

The most common type of urinary injury during laparoscopy is bladder perforation with an incidence of 0.02% to 8.3% [18]. Most injuries occur during hysterectomy operations. Pillet et al [19] reported the incidence of bladder injury during laparoscopic hysterectomy to range between 1%. Endometriosis, previous surgery, an inexperienced surgeon, over distended bladder, and pelvic adhesions are proposed risk factors for bladder injury.

Bladder injury may occur during insertion of trocars, especially suprapubic ones, dissection of the bladder during gynecologic operations, or as a result of thermal energy. Of bladder injuries, 90% have been reported to occur at the bladder dome, and the rest at the base [18]. Of these injuries, 33% were sharp electrocautery dissections, 21% were blunt, 30% were via laser, and 15% by scissors [18]. Five percent of thermal injuries may lead to fistula formation[21].More than half of trocar-related injuries occur via 5-mm and the rest via 10-mm trocars.

Only 9.2% of bladder injuries were not recognized intraoperatively, in contrast to ureteral injuries; therefore, morbidity is lower [21]. In suspected cases, filling the bladder with methylene blue dye to observe dye leakage will help with diagnosis. Patients with unrecognized cases presented with abdominal discomfort and oliguria as a cardinal sign. According to type, size, and localization of injury, conservative or surgical management via laparoscopic, laparotomic, or vaginal approaches may be considered.

Two patients had grade 4 endometriosis with dense adhesions distorting the pelvic anatomy. Three patients had multiple fibroids in the uterus involving the cervical region, two of which also had bladder injury. One had enlarged uterus (28-30 weeks) with dense omental adhesions to the anterior abdominal wall extending from umbilicus to bladder plus patient could not tolerate head low with high insufflation, hence, laparotomy was done. Three patients also had multiple dense adhesions between uterus, omentum and anterior abdominal wall, probably due to history of previous 2 C-sections and endometriosis. Another patient had an enlarged uterus of about 32 weeks with dense adhesions due to previous abdominal surgery. In two patients hysterectomy was completed laparoscopically but laparotomy had to be done due to ureteral injury for which ureteral re-implantation with DJ stenting was done. In three cases reason for conversion was not documented.

Our conversion rate adheres to the NICE guidelines conversion rate of <7%. The conversion rate was also comparable to other series, Katherine et al [16] reported a conversion rate of 0.16%. 5 out of 830 patients were converted to open laparotomy due to massive lower segment myomata in 3 patients and uncontrolled retroperitoneal bleeding in the other two. Celik et al [17] reported a conversion rate of 1.6%. One out of 62 patients was converted to laparotomy due to enlarged uterus with history of previous C-section.

In contrast to these findings, Sokol et al [22] reported that pelvic adhesions and previous laparotomy were coorelated with an increased risk of conversion to open surgery during gynaecological laparoscopy. Leonard et al [23] reported that uterine width, lateral myoma and a history of abdominopelvic surgery were significantly associated with laparoconversion in TLH patients.

Our study reported no case of intestinal injury, vascular injury, infections, wound healing problems or any other major complication. The incidence of intestinal injury is reported to be 0% to 0.5% [24]. Injuries involving the inferior epigastric vessel are the most common type of vascular complication. The incidence of abdominal wall bleeding is 0.3% to 05%.11 [24].

## CONCLUSION

Total laparoscopic hysterectomy when performed by a trained and experienced surgeon in a good hospital set up offers minimal complication rates and shorter postoperative hospital stay. Thus, the technique of laparoscopic hysterectomy appears as a safe and effective approach towards a patient requiring hysterectomy, plus it also provides excellent access to the entire abdomen as needed in cancer surgeries, for patients with pelvic masses, endometriosis, pain or adhesions with minimal morbidity.

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