REVIEW ARTICLE ON TOTAL LAPAROSCOPIC RADICAL HYSTERECTOMY VERSUS RADICAL ABDOMINAL HYSTERECTOMY.

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PROJECT SUBMITTED AS PART FULFILMENT FOR THE AWARD OF DIPLOMA IN MINIMAL ACCESS SURGERY (D.MAS) TO TGO University NAGALAND, VIA LAPAROSCOPY HOSPITAL, NEW DELHI, INDIA. APRIL 2008

ABSTRACT

Cervical carcinoma is the second most common cancer in women, particularly from the developing countries. The treatment modality for this condition until recently has been radical hysterectomy which is an extensive surgery requiring a very good knowledge of the pelvic anatomy. Presently laparoscopy has been introduced as a new form of treatment in the practice of oncology and for any new technique to gain acceptance, it has to be comparable to the gold standard. Laparoscopic surgery has widely replaced open surgical techniques in some routine cases because of it s obvious advantage of less trauma, less pain, shorter hospital stay and rapid return to normal duty. This study is a critical review of laparoscopic radical hysterectomy as it compares to radical abdominal hysterectomy in the management of gynaecological Oncology cases.

The objective of this review article was to compare radical abdominal hysterectomy to laparoscopic radical hysterectomy with a view to determining the outcome and safety of both procedures by comparing, operative time, blood loss, conversion and complication rates, number of lymph nodes dissected , hospital stay, disease recurrence and survival rate.

The materials and methods of this study was the assessment of relevant literature from Medline, Pubmed, Cochrane Library, Google and Yahoo search engines and Springer link Electronic library at laparoscopic hospital

The results showed that laparoscopic radical hysterectomy was comparable to radical abdominal hysterectomy with less blood loss, shorter hospital stay and a comparable disease recurrence and survival rate. However the operative time for laparoscopic surgery was found to be longer.

In conclusion laparoscopic radical hysterectomy is a suitable alternative to radical abdominal hysterectomy in experienced hands, for the management of indicated gynaecological malignancies.

INTRODUCTION

Worldwide there are 500,000 new cases of cervical cancer reported annually making it the second most common cancer in women, with 80% of cases from developing countries 1. Radical abdominal hysterectomy (RAH) is indicated in patients with diagnosed Cervical cancer with FIGO stage 1A2 and 11A selected patients with stage 11 adenocarcinoma of the endometrium in whom radical surgery is feasible, upper vaginal carcinoma,uterine or cervical sarcomas and other rare malignancies confined to the cervix, uterus and/or the upper vagina 2. The first radical hysterectomy was performed by Clark at Johns Hopkins's Hospital in 1895. Wertheim added removal of the pelvic lymph nodes and parametrium to what Clark did and in

1905, he reported an operative mortality rate of 18% and major morbidity 31%,3. The procedure entails removal of the Uterus and parametrium (Broad, Round, Cardinal and Utero-Sacral ligaments) and the upper one-third to one-half of the vagina, with bilateral pelvic node dissection. A good knowledge of pelvic anatomy, meticulous sharp dissection and mobilization of the bladder and rectum is required for this procedure 2 3. The five-year survival rate for primary surgical radical abdominal hysterectomy is 83% and this is comparable to radiation therapy which has a survival rate of 74% 4.

Acceptance of a new surgical technique in the practice of oncology requires that technical feasibility be demonstrated and morbidity and mortality associated with it are not prohibitively high, also, short and long-term survival should be comparable to that of the accepted standard therapy. Techniques used to perform radical hysterectomy with aortic and pelvic lymph node dissection laparoscopically are well-described 5 . Much less is known about the morbidity and mortality associated with this procedure and even less has been published regarding short or long-term survival following laparoscopic radical hysterectomy (type III), aortic and pelvic lymph node dissection 6. Laparoscopic radical hysterectomy (LRH) with para-aortic and pelvic node dissection was first performed by Nehzat et al in 1989 6. There are two types of Laparoscopic radical hysterectomy , the first type being the total laparoscopic radical hysterectomy in which the entire process of radical hysterectomy is carried out laparoscopically, however closure of the vaginal vault could also be done through the vaginal route. Laparoscopic assisted radical vaginal hysterectomy (LARVH) is the second type and it involves mobilisation of the ureters ureteric dissection, lymphadenectomy and development of the paravesical and pararectal spaces laparoscopically,while the rest of the procedure is completed vaginally as classically described by Schauta 6.

Minimal access surgical procedures are now proposed for many open procedures and have largely replaced the open approach for many common surgical procedures such as appendicectomy and cholecystectomy. The obvious reduction in trauma to the abdominal wall and pelvic organs confers a number of potential advantages, including a shorter hospital stay, less pain, faster recovery time and more rapid return to normal function 7 8.

It is therefore an attractive prospect for surgeons seeking to reduce the morbidity of open radical abdominal hysterectomy. As the trend toward minimal access surgery increases, it is necessary that these techniques be evaluated further in order to confirm that the new technique reduces risks without affecting outcome and quality of life subsequently. A systematic review examining all the relevant outcomes is needed in order to enable patients make informed choices about their preferred route of surgery 9.
Despite aiming for similar goals, the variety of laparoscopic radical hysterectomy techniques available makes comparisons difficult with radical abdominal hysterectomy. This article will therefore review radical abdominal hysterectomy and total laparoscopic radical hysterectomy from relevant articles.

OBJECTIVE
The objective of this review article is to compare safety and outcome between radical abdominal hysterectomy and total laparoscopic radical hysterectomy done for gynaecological malignancies. The following parameters were assessed , Operating time, blood loss, conversion rate, number of Lymph nodes dissected, intra-operative injuries, infection, Hospital stay, return to normal activities, post-operative urinary dysfunction, post-operative bowel dysfunction, disease recurrence, five year survival and quality of life.

MATERIALS AND METHODS

This involved the review of related articles to radical abdominal hysterectomy and total laparoscopic radical hysterectomy with the aim of realizing the objectives of the study. The scope of this review covered Medline, Pubmed, Cochrane library, Google search engine, Yahoo search engine and Springer-Link Journal Electronic Library.

REVIEW OF ARTICLES

Operative time; in all the articles reviewed the operating time for total laparoscopic radical hysterectomy was longer than for radical abdominal hysterectomy, with operating time ranging from 205minutes to 344minutes in total laparoscopic radical hysterectomy as against radical abdominal hysterectomy which ranged from 217minutes to 307minutes 10 -14. Operating time, cost, complications, learning curve and the lack of well-defined indications are factors that have limited the widespread adoption of laparoscopy 15. Duration of surgery and complication rate are dependent on the experience and expertise of the surgeon in laparoscopic procedures 15.Wattiez et al (16) in their series of over 1647 laparoscopic hysterectomies demonstrated a significant decline in operative time from 115minutes to 90minutes.

The issue of **blood loss** in any surgical procedure is of prime importance because of its adverse effects on the patient and when excessive the fact that blood transfusion (with the risk of transmission of HIV/AIDS and transfusion reactions) remains one of the modalities of treatment makes it even worrisome. The advantage of a laparoscopic approach over the open abdominal route been demonstrated repeatedly17 18. Review of literature showed blood loss from total laparoscopic radical hysterectomy to be less or not statistically significant when compared to radical abdominal hysterectomy. Average blood loss for total laparoscopic radical hysterectomy was 293mls (211 – 369mls) and for radical abdominal hysterectomy 444mls (245 -548mls). 10 - 12 14, 19. Obesity may however increase blood loss in laparoscopic procedures, Holub et al (20) reported on peri and post operative outcomes in obese versus non obese patients using a minimally invasive approach and found that there was a higher number of major complications in the obese subgroup, like injury to the epigastric artery, uncontrolled bleeding, injury to the bladder and pulmonary micro-embolism. Injuries to the bladder and epigastric artery highlight the difficulties of trocar placement in patients who are morbidly obese 21. Transfusion rate was equally lower in total laparoscopic radical hysterectomy than radical abdominal hysterectomy 11% to 15% respectively this however was not statistically significant 11.

Pelvic and para-aortic lymphadenectomy is an integral part of oncological surgery, the number of nodes resected has been found to be significantly associated with overall survival. Marnitz and collaborators 22, investigated 84 patients and found that removal of more than five pelvic nodes and/or more than five para aortic lymph nodes was associated with significantly longer survival. In all the four articles reviewed on nodal resection10 – 12, 14, there was a statistically significant number of nodes resected in patients who had total laparoscopic radical hysterectomy (19, 31 nodes) as against the radical abdominal hysterectomy (14, 21nodes) group in two articles 11, 12. This was not the case in the other two articles which did not find any significant statistical difference 10, 14. This may be attributed to the fact that the sample size was smaller in the statistically significant group.

There is a need to assess **complication and conversion rates** in both total laparoscopic radical hysterectomy and radical abdominal hysterectomy. Chi et al (23), noted a low rate of 2.5% and a conversion rate of 7%. They identified older age, malignancy, previous irradiation and previous abdominal surgery as significant risk factors for complications or conversion to laparotomy, which should guide surgeons in patient selection. Makinen et al (24) looked at 10,110

hysterectomies and had a conversion rate to laparotomy from laparoscopy ranging from 4%to 7% and the factors identified were large uteri, diminished uterine mobility, dense abdominal adhesions and uncontrolled haemorrhage. They however demonstrated a significant drop in all major complications beyond 30 procedures. Some of the other articles reviewed had a zero conversion rate 12, 25, 26. It is note worthy that these articles were published between 2006 and 2007 which lends credence to the fact that laparoscopy becoming a routine procedure in the armamentarium of many Gynaecologists 27. Complications following radical surgery could be intra-operative or post operative. The intra-operative complications include inadvertent damage to surrounding structures like the bladder, bowel, ureter, pelvic nerves and vessels,deep vein thrombosis and subsequent embolism 3. Post operatively patients may have vesical or ureteral fistulae, over flow incontinence, urinary retention, loss of bladder sensation because of bilateral disruption of the parasympathetic and sympathetic fibres of the bladder and ureter, this usually resolves by the third week 3. In all the relevant articles reviewed there was no statistically significant difference in intra-operative urinary complications (bladder and ureteral injury) and return to normal bladder activity for both total laparoscopic radical hysterectomy and radical abdominal hysterectomy.10,11,14,15,25,26. Laparoscopic surgery appears to be inherently safer than conventional surgery 28. However the overall complication rate is generally less, this is not inevitable 17. What is definitely true is that major complications such as viscus injury and bleeding from retroperitoneal vessels are common and unfortunately many injuries are not recognized during the procedure 29. Certain complications are specific to laparoscopy. Pneumo-peritoneum decreases venous return and subsequently, cardiac output and increases systemic vascular resistance and 7, 30. Both of these increase risk of cardiac disease. In addition respiratory mechanics can be affected adversely as a result of the Trendelenburg position, in combination with the increased intra-peritoneal pressure provided by Carbon dioxide, exerts greater pressure on the diaphragm potentiating hypoventilation, resulting in metabolic acidosis 31.

Carbon dioxide gas which is used for insufllation in laparoscopic surgeries has antiseptic properties because it is converted to carbonic acid and this is believed to reduce the risk of post-operative infectious morbidity32. In the study conducted by Frumovitz et al (11) 53% of patients who had radical abdominal hysterectomy experienced post-operative infectious morbidity compared with 18% for total laparoscopic radical hysterectomy.

Hospital stay is one of the factors that reduce cost in laparoscopic as against open procedures. Several studies have shown that shorter hospital stay and the use of reuseable instruments has made the cost of laparoscopic hysterectomy to be comparable to abdominal hysterectomy 33. In all the relevant references hospital stay was significantly shorter in total laparoscopic radical hysterectomy than radical abdominal hysterectomy. In addition Plante and Roy 34 also found that operative laparoscopy helps to prevent unnecessary laparotomies, can reduce morbidity and leads to a shorter hospital stay

The **recurrence of tumors** in general would depend on histological type, grade, stage of the malignancy and adequacy of the surgery. Total laparoscopic radical hysterectomy has been shown to be comparable to radical abdominal hysterectomy in terms of extent of negative margins obtained, disease free status of patients, tumor recurrence and **five year survival** 10 12 14 19 25 26 35 36. Schlaerth et al (37) evaluated women with cervical cancer undergoing laparoscopic retroperitoneal lympadenectomy which was immediately cross checked by laparotomy and found that laparoscopic aortic lymph node sampling could be performed adequately. Researchers are worried that tumor implantation might be more associated with laparoscopy. Abu Rustum and colleagues (38) noted that laparoscopic related squamous cell tumor implantation was rare, occurring in 0.97% of women undergoing transperitoneal

laparoscopy with malignant disease. Patients with advanced intra-abdominal or pelvic metastatic disease and progressive carcinomatosis appeared at greatest risk. They concluded that the risk of squamous cell tumor implantation should not preclude laparoscopy in women with gynaecological malignancies managed by gynaecological oncologists.

DISCUSSION

Radical surgeries in general are associated with more morbidity and in some cases greater mortality than non radical surgeries, the reason for this can be attributed to the extensive nature of tissue dissection and disruption of radical procedures. This is further increased in open surgery where access to tissues is more. Laparoscopic procedures in general are associated with less tissue disruption, less pain, less infection and adhesion formation because of the reduced incision, little or no tissue handling and use of energy sources like diarthermy. All these contribute to a better outcome particularly for patients with cancer. Presently medical practice is geared towards efficiency and patient satisfaction which is also one of the qualities of laparoscopy. It has the advantage of being used to determine patients eligibility for continuation of radical surgery, if prior diagnostic laparoscopy contraindicates radical surgery as may be seen in cases of under staging. When laparoscopy is compared to laparotomy, they both have similar outcome with earlier recovery, shorter hospital stay, and an improved quality of life for the treatment of endometrial cancer. In cervical cancer, reports now confirm the feasibility of radical hysterectomy via laparoscopy. The disease free and overall survival were similar in patients treated by laparoscopy and laparotomy.

CONCLUSION

Minimal access surgery continues to develop and has become more widely accepted and a suitable alternative to radical abdominal hysterectomy in the management of gynaecological cancers. Patients' satisfaction has also helped to drive the discipline of minimal access surgery. The advantages of less post operative pain, shorter hospital stay and smaller incisions are more acceptable to patients suffering from gynaecological cancer. It has been shown to be safe and feasible while treating patients with the same efficacy as traditional open procedures 37.
There is need to emphasize that this highly skillful art is not for the uninitiated, experience definitely makes the difference between success and failure and life and death.
Laparoscopic surgery has come a long way and has faced a lot of castigation and scrutiny, amidst all this, it has continued to wax stronger and break new grounds in new frontiers.

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