

Abstracts

EVOLUTION OF LAPAROSCOPIC HYSTERECTOMY

Peter J. Maher
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Harry Reich reported the first case of laparoscopic hysterectomy in 1989. Following this report, there appeared a dearth of personal experiences with this procedure. The catchcry of enthusiasts was "LAVH enables an abdominal procedure to become a vaginal one".

Unfortunately, many procedures which could have been performed easily by the vaginal route, in competent hands, were complicated, at least time wise, by the addition of laparoscopy. Never in the history of gynaecological surgery has a procedure been so closely scrutinised as has laparoscopic hysterectomy and all its variations.

Enthusiasts of LAVH thought that, with the coming of the 21st Century, all hysterectomies would be performed either by the vaginal route alone or combined with operative laparoscopy.

The proportions of hysterectomies divided between the different routes has undoubtedly changed.

For the late 80's, 75 – 80% of all hysterectomies

were performed by the abdominal route. Today approximately half are performed this way. The laparoscope, although making some impact, approximately 15%, does not account for the other 50%. Surgeons threatened by the learning curve endeavoured to improve their vaginal surgery skills and this route now accounts for 35% up from 20%. Rigorous re-examination of LAVH and its outcomes suggest a higher incidence of urological injuries with this technique. Once surgeons realised the dangers associated with the use of the stapling devices, urological injuries, I suggest, are more commonly associated with the vaginal approach to the hysterectomy and not the laparoscopic approach.

This presentation will discuss the evolution of the procedure of laparoscopic hysterectomy with mention of the deviations introduced to minimise unexpected complications and its overall place in gynaecological surgery.

TOTAL LAPAROSCOPIC HYSTERECTOMY – TECHNIQUES AND PITFALLS

Robert T O'Shea
Flinders Endogynaecology, Flinders University and Flinders Medical Centre
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Total laparoscopic hysterectomy (TLH) was first proposed in the early 1990's by Reich & Liu. The aim was for a clear, precise approach with reduced blood loss and hospital stay compared to laparoscopically-assisted vaginal hysterectomy (LAVH).

Gynaecologists who consider they have mastered LAVH may feel reluctant to progress to TLH due to preconceived increased complications and risks. Published data covering cystotomy and ureteric damage rates for both procedures are equivalent, whereas blood loss and hospital stay are reduced with TLH. The use of a vaginal tube (e.g. McCartney tube) in conjunction with uterine elevation, facilitates

safe ligation of uterine arteries and colpotomy, as long as the operator has delineated the position and path of the ureter.

Uterine artery occlusion may be performed using bipolar diathermy, sutures or clips. Colpotomy, using the tube can be safely achieved with unipolar diathermy or the harmonic scalpel. Once the operator has conquered these hurdles total laparoscopic hysterectomy becomes a safer and more effective option.

- 1 O'Shea R.T., Gordon, S.J., Seman E.I., Verco C.J. (2000) "Total Laparoscopic Tube Hysterectomy: a safer option?" *Gynaecological Endoscopy* 9 (5) 281-291

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THREE BEST FREE COMMUNICATIONS ON THE TOPIC OF LAP HYSTORECTOMY,
please refer to pages 29 & 30

EXTENDING YOUR HORIZONS – HYSTERECTOMY & PLN DISSECTION

Assoc. Professor Thomas W. Jobling

Optimal management of gynaecological malignancy requires accurate staging and evaluation of disease distribution.

Current modalities which are most often used include MRI, CT and tumour markers. More recently we have utilised PET scanning, but ultimately no

diagnostic modality has surpassed histological evaluation of lymph nodes.

Nodal status is one of the most important prognostic variables and our rationale and surgical technique will be presented.

INDICATIONS FOR SUBTOTAL HYSTERECTOMY

Charles E. Miller, MD FACOG,
Clinical Associate Professor
University of Illinois at Chicago

The incidence of subtotal hysterectomy has increased in the United States. Part of this rise has been based on the laparoscopic approach. Because the subtotal hysterectomy minimizes anatomical disruption, supporters have claimed that this procedure is less likely to have adverse outcomes. This includes less compromise to bowel function, bladder function, sexual function and vaginal prolapse. On the other hand, detractors raise concerns with cervical cancer, and post operative cyclic bleeding.

This discussion will highlight current literature (or lack thereof) critically comparing subtotal hysterectomy

and total hysterectomy. While literature involving laparotomy is sparse, the current literature comparing a laparoscopic approach is virtually non-existent.

The risk of cancer in the surgical stump is low (less than 0.1 percent). There appears to be no advantage in regards to pelvic floor support, long term sexual function, bladder function or bowel function. Post operative recovery is a definite advantage of a laparoscopic subtotal hysterectomy. Onset of intercourse appears shorter. Concerns, however, must be raised in the woman who presents with endometriosis and pelvic pain.

WHICH HYSTERECTOMY? THE EVIDENCE

Ray Garry

Recently published data has thrown new light on the problems associated with all forms of hysterectomy. We have an increasingly clear idea of the rate of various methods of hysterectomy. LH is now performed in developed countries at a rate of about 10% (range 3 to 25%). We also have a clearer idea of the benefits and side effects of subtotal compared to total hysterectomy. Some of the claimed long term benefits have not been confirmed but there appear to be some real short term advantages such as less pain and more rapid early recovery associated with the subtotal approach.

We know more about the current rate of complications associated with all forms of hysterectomy and there seems little doubt that in large populations studies there is a greater risk of operative haemorrhage and ureteric damage associated with the laparoscopic

approach than the abdominal approach. There is however no doubt now that avoiding a laparotomy either by laparoscopic or vaginal techniques is associated with significant patient-centered benefits such as less pain, quicker recovery and a more rapid return to sexual activity and a quicker improvement in post-operative Quality of Life measures.

The evidence now demands that hysterectomies should be done increasingly by either laparoscopic or vaginal methods at the expense of open abdominal hysterectomy. For the same reasons that recommend avoidance of laparotomy incisions Subtotal hysterectomy should also be considered more frequently. Complications can be avoided and increasing use of vaginal delineators or modified forms of hysterectomy appear to be useful in this regard.

HYSTERECTOMY IN 2020

Duncan Turner MD

It is now 14 years since the first total laparoscopic hysterectomy was performed by Dr. Harry Reifdh. I believe we have all been disappointed with the slow progress of the art of laparoscopic surgery. What we are able to do and what we actually do are very different entities. It is likely that that dichotomy may still exist in the year 2020. Certainly we will have progressed with the science perhaps utilizing robotics and imaging techniques rather than traditional surgery, but will they be in widespread

use or like current endoscopic surgery utilized by a small percentage of the practitioners.

I believe it behoves us as laparoscopists in the year 2000 to set the course for our surgical specialty for the future not so much to see just what we are capable of doing in another seventeen years, but more importantly to enable access to improved surgical techniques to the general population. This is going to mean modelling the surgeons of the future and perhaps using our improved technologies in training rather than in surgical augmentation.

IS ACCREDITATION INEVITABLE?

Dr Andrew Child

The concept of Clinical Governance is now well established and there are clear expectations from healthcare authorities (both public and private) and from patients themselves that hospitals will comply with such clinical governance criteria. One of these criteria is accreditation and this applies at a number of levels in the healthcare service.

1. Hospital Accreditation.
2. Departmental Accreditation.
3. Credentialling of individual practitioners.
4. Allocation of clinical privileges.

The allocation of clinical privileges must take into consideration the designated role of the hospital and the services being provided as well as the support capabilities of the unit.

In allocating clinical privileges to individual practitioners the concepts of "equivalency" and "competence" need to be assessed. Equivalency is a relatively easy concept to assess and involves reviewing the training, appointments and experience of the applicant in an objective fashion. The concept of assessing competence is far more difficult (particularly in relation to the performance of surgical procedures) and some potential pathways will be discussed as well as the inevitable pitfalls of such assessments.

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LAP PELVIC TRAINER – MELBOURNE MODEL

Zorana Mayooraan,[§] Scott Pearce,^Δ Luk Rombauts,^Δ T. Ian H. Brown,[§] Jim Tsaltas,^Δ Anthony S. Lawrence,^Δ Kym Fraser,[∞] David L. Healy^Δ

Background:

Educational measurement of surgical skills can be used to optimise the learning process and monitor the quality of surgical skill. To be effective, educational measurement must be valid, reliable, feasible, fair, objective, appropriate and credible.^{1,2} It must also define skills to be measured and appropriate assessment criteria. No formal method has been implemented for the objective assessment of technical skills.

Objective:

To assess if it was possible to validate an objective assessment instrument for laparoscopy by re-testing surgeons with the same test 1 year apart. The hypothesis tested was that performance of surgeons in the initial test predicted their performance 1 year later.

Subjects:

Twenty specialists in obstetrics and gynaecology were randomly selected and tested on the Monash University gynaecological laparoscopic pelvi-trainer. Twelve candidates were consultants with 9-28 years of practice in operative laparoscopy, and 8 were registrars with up to 6 years of practice in operative laparoscopy. Seven consultants and 1 registrar were from rural Australia, and 3 consultants were from New Zealand.

Design:

Subjects were asked to complete 10 laparoscopic stations.³ Nine of these tested manual dexterity skills and the correct use of laparoscopic instruments. One task tested theoretical knowledge of electrosurgery. Candidates were marked based on a task-specific checklist. Pass/fail mark was awarded for each task. All checklist items had to be satisfied to attain a pass in each station, with the exception of task 1. At the completion of the test, each candidate received a Personal Best (PB) score. We re-tested 11 candidates 1 year later with the same stations.

Setting:

Tests were held in teaching and non-teaching hospitals.

Main outcome measures:

Improvement in laparoscopic skill in 1 year of obstetrical & gynaecological practice.

Results:

The PB score of candidates in the initial test had a strong positive correlation with their scores one year later ($r = 0.88$, $P < 0.05$). Significant improvement in the pass rate for some tasks was recorded. Performance in other tasks, such as line cutting and intracorporeal knot tying did not significantly improve. No candidate successfully completed the written electrosurgery station in the initial test. A slight improvement in the pass rate to 18% was observed in the second test. The pass rate of the diathermy station dropped from 50% to 36% at the second test.

Conclusion:

The results obtained in this study proved the validity of this assessment instrument. We concluded that laparoscopic surgical skill can be objectively measured. The ranking was reproducible 1 year later. The study also found ignorance of electrosurgery/diathermy among gynaecological surgeons. One year later, skills were no better.

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3. Mayooraan Z, Tsaltas J, Rombauts L, Brown TIH, Lawrence AS, Fraser K, Healy DL. Educational model for an objective assessment of operative laparoscopic skill. *Gynaecological Endoscopy* 2002;**11**:59-66.

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RESIDENT EDUCATION AND TRAINING IN GYNECOLOGIC ENDOSCOPY IN THE U.S.A.

Charles E. Miller, MD FACOG, Clinical Associate Professor, University of Illinois at Chicago

Operative endoscopy has become a vital component in the practice of gynecologic surgery. Despite this fact, the growth and longevity of operative endoscopy must be considered in the U.S.A. Falling insurance reimbursements, rising malpractice costs in a litigious society, instrumentation costs, hospital charges, vanishing case load, and diminishing post graduate education are all negative factors. As a result, the AAGL continues to see a downward trend in membership.

To try to stem the tide of the decline of endoscopy in the U.S.A., the AAGL has taken an active role in resident education. Although the ABOG has set skill and experience standards for training programs in the U.S.A., residents in OB/GYN have widely varied experience at graduation. The AAGL along with private

funding offers resident training programs to attempt to lessen these variances. The programs consist of didactic lectures outlining operating room setup, instrumentation, energy, complications, surgical technique as well as procedure based discussion. The second aspect of the Resident Training Program is a highly technical skills lab. The Resident Training Program recently completed had nearly 250 participants.

Finally, through the AAGL and ASRM and private funding, one year fellowships in endoscopy training are offered. Unfortunately, currently there are many more applicants than positions. Moreover, because young physicians work closely with a single practitioner, experience once again is variable.

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LAP SURGICAL TRAINING IN CANADA

Larry Demco

Training is dependent on the laparoscopic procedure level.

Level 1

- Laparoscopic sterilization
- Needle aspiration of simple cysts
- Ovarian biopsy
- Minor adhesions
- Laser or diathermy for endometriosis
- Linear salpinostomy and /or salpingectomy for ectopic pregnancy

Level 2

- Laparoscopic division of uterosacral ligaments
- Adhesiolysis for moderate and sever adhesions or adhesions involving bowel

- Salpingostomy for infertility
- Salpingectomy or salpingo-oophorectomy
- Laparoscopic ovarian cystectomy
- Endoscopic management of endometrioma
- Endoscopic surgery for stage 3 and 4 endometriosis
- Laparoscopic hysterectomy
- Laparoscopic Burch

Level 3

- Myomectomy
- Pelvic lymphadenectomy
- Pelvic side-wall dissection
- Pre-sacral Neurectomy
- Dissection of an obliterated Pouch of Douglas

Laparoscopic skill rating form						
Subjects name						
Level of training	1	2	3	4	5	>6
Operative procedure						
Date of operation						
Method of Rating	1 (in vivo)			2 (video tape review)		
Rater's Name						
Item	Novice			Expert		Not Observed
	1	2	3	4	5	N/O
Trocar Placement	Uses inappropriate trocar numbers and site selection Insertion technique risks Injury to vessels or viscera			Ideal trocar numbers and site selection; insertion technique is performed safely with trocar tip visible throughout		
Item	Novice			Expert		Not Observed
	1	2	3	4	5	N/O
Tissue and Instrument Handling	Poor instrument choice tissue handling is rough and dissection awkward and inefficient			Uses correct instruments to safely and meticulously delineates structures, divide tissues, and opens tissue plans		
Item	Novice			Expert		Not Observed
	1	2	3	4	5	N/O
Electro-Surgical Dissection	Cauterization often inadequate and bleeding ensues or is excessive, with damage to adjacent or non-targeted tissues			Safely cauterizes and divides tissue with minimal bleeding; keeps tips in view and avoids non-targeted tissue		
Item	Novice			Expert		Not Observed
	1	2	3	4	5	N/O

Knot tying/ Ligation	Knot tying or endoloop ligation is slow.ackward And improperly placed Or cinched					quickly and correctly performs intra-and-extra corporeal knots and or endoloop ligation		
Item	Novice					Expert	Not Observed	
	1	2	3	4	5	N/O		
tissue removal	Tissue morcellation or retrieval is awkward, unsafe, or incomplete; poor choice of port for specimen removal or poor port dilation technique					Uses correct technique to remove all tissue under direct vision through an appropriate port		
Item	Novice					Expert		Not Observed
	1	2	3	4	5	N/O		
Procedure Completion	Fluid, debris, and gas removal are incomplete; Does not inspect for Bleeding; does not observe Instruments during Their removal					Fluid, debris, and gas removal are complete; thouroghly inspects for bleeding; all instruments removed under observation		
Number of items observed								
Total score								
Average score								

CTEC - IS IT WORKING?

Ray Garry

The simple answer to this question is Yes! There have been difficulties with access and finance but these have recently been to a large extent resolved. As a center to bring together all that is best in laboratory based surgical training skills in one area in the center of the University campus has been an unqualified success. I will not discuss in detail the many non-gynaecological course such as the virtual hospital and virtual operating room facilities. Neither will I dwell on the fantastic open surgery course 'Anatomy of Complications' run by Ian Hammond and John Taylor save to say that by using the anatomy department for cadavers, the skills laboratory for practice on isolated tissues and the animal laboratory to practice real live

surgical emergencies this course has become one of the most effective run anywhere in the world. I wish to describe in more detail the attempts we are making to incorporate all of these same techniques into routine postgraduate training in Perth and farther afield. We believe that surgical skills like other motor skills must be constantly practiced and rehearsed and we are therefore trying to evaluate the best way to do this. We are undertaking a RCT of all our training grade medical staff to determine if Virtual Reality and/or repeated structured training in animals improves subsequent surgical performance.

Details of this study will be presented.

LAPAROSCOPIC SUTURING – HOW TO DO IT?

Alan Lam

Centre for Advanced Reproductive Endosurgery, Department of Obstetrics and Gynaecology,
Royal North Shore Hospital, Northern Clinical School, University of Sydney

Learning objectives:

At the end of this presentation, the gynaecologist will understand:

1. The role of suturing in laparoscopic surgery
2. The ergonomics involved in laparoscopic suturing
3. Instrumentation requirement
4. Patient positioning
5. Port positioning
6. Criteria for selecting suture and needle size
7. Criteria for selecting extracorporeal vs. intracorporeal knot
8. The basic principles of different types of knots and suturing techniques
9. The clinical applications of suturing in laparoscopy

Setting:

The CARE Advanced Integrated Training Program
Northern Clinical School, University of Sydney

Interventions:

Five-day training course
Structured learning objectives
Baseline assessment of suturing skill level
Didactic teaching on a one-to-one basis
Hands-on practice in clinical skills labs
Practical demonstration in live surgery
Hand-on practice in anaesthetised animal labs
Assessment of skill level at the end of the course

Measurements and results:

Performance measurement criteria:

- Time based
- Use of assistance
- Flow of specific knot-tying and suturing task

Conclusion:

Suturing is an essential skill in endoscopic surgery. Through a structured learning setting, surgeons have found that mastering knot-tying and suturing can be achieved within a short time.

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AGES RESEARCH GRANT PROGRAM 2003-2005

Ian S Fraser, Chair, AGES Research Grant Sub-committee

AGES has been very fortunate to have attracted a very substantial research grant from Stryker Australia. The AGES committee has added to this sum to make available a total of \$300,000 to be disbursed over 3 years for quality research carried out by members of the Society. Preference for funding will generally be given to projects involving gynaecological endoscopic surgery. The first round of funding was made available at the end of 2002 for research in 2003, and a total of \$51,000 was awarded for three projects (all of which have the possibility of attracting recurrent funding for 2004, if interim reports are satisfactory).

It is the aim of the committee to encourage high quality and well planned applications with clear study objectives, valid statistical considerations and a properly presented protocol.

A package of detailed information is available from the AGES Secretariat. A package of detailed information is available from the AGES Secretariat. Advice on statistics and protocol preparation is also available. Funding is unlikely to be awarded at a level above \$50,000 for any single project in any one year, and the committee generally hopes to recommend the awarding of funds between \$10,000 and \$30,000 per project per year to a variety of different types of project.

Applications for funding in 2004 should be submitted to the AGES Secretariat by Friday 3 October 2003.

All valid applications will be sent to two independent referees and will be considered by those members of the committee who have no conflict of interest with any of the applications.

FIBROID RESEARCH AND MEDICAL MANAGEMENT

Beverley J Vollenhoven Ph.D., FRANZCOG., CREI
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Uterine leiomyomas (fibroids) are the commonest solid tumours in women. They are documented to occur in at least 50% of women during their reproductive years. In most countries, they are the most frequent indication for hysterectomy in pre-menopausal women. In Australia 22% of hysterectomies are performed because of fibroids (the prevalence of hysterectomy is 3.97/1000 women), at an annual cost of \$100,000,000 to the community. It has been estimated that 10-15% of women between the ages of 25-64 years will require a hysterectomy for fibroids.

There are 2 problems that limit the progress of research into the aetiology of these tumours. Firstly, fibroids are heterogeneous which makes comparative studies difficult and secondly there are no useful animal models in which to study these tumours. Notwithstanding these problems the research into why these tumours grow continues. Studies so far can be broadly grouped into 5 areas:

- 1 Sex steroids. Research in this area has mostly reported an increase in sex steroid receptor content in fibroids compared with myometrium.
- 2 Peptide growth factors. There are a number of

factors that have been examined including the IGFs, EGF and the TGFs. We have shown an increase in IGF-II mRNA and a decrease in IGFBP-3 mRNA in fibroids compared with myometrium which given the biology of these factors may give a growth advantage to these tumours.

- 3 Genetic differences using microarray. This is an exciting area of research that is promising in its outcomes. Of 10,500 genes that were investigated, we showed a difference in gene expression in 27 genes of which 15 were over expressed in fibroids. Ongoing research will confirm these differences using more conventional research methods as well as examine the function of these genes in tumour growth.
- 4 Angiogenesis. Using the method of immunohistochemistry we reported that fibroids are not as vascular as myometrium as they had smaller blood vessels and not as many of them. Ongoing research in this area aims to discover the angiogenic activity in fibroids, peri-fibroid myometrium and distant myometrium. In the future angiogenesis inhibitors may provide a medical treatment option for fibroids.

Traditionally, these tumours have been treated surgically by either hysterectomy or myomectomy. There are no drugs that cause permanent shrinkage of these tumours. Best known are the gonadotrophin hormone releasing hormone analogues (GnRHa). They are derivatives of hypothalamic GnRH which are 9-200 times more potent than native GnRH. Administered continuously they induce a state of temporary and reversible hypo-oestrogenism. These drugs cannot be administered long-term (>6 months) due to risk of bone loss and possible osteoporosis. These drugs should only

be used as pre treatment prior to either myomectomy or hysterectomy. Even their use in this situation is debatable. Other drugs that have shown to be useful in fibroid shrinkage include GnRH antagonists, RU486, and gestrinone. In postmenopausal women raloxifene has been shown to cause fibroid shrinkage. A number of alternative medicines have been reported to either cause fibroid shrinkage or provide relief of menorrhagia. These medicines are mostly different Chinese herbal preparations. None have been subjected to randomized controlled trials.

THE CURRENT PLACE OF UTERINE ARTERY EMBOLISATION

Thomson K R, MD, FRANZCR, Professor & Director of Radiology, The Alfred, Melbourne

Objective:

To discuss the current state of uterine artery embolization for a variety of conditions including uterine fibroids, its strengths and weaknesses and to describe strategies for optimal patient care.

Methods:

Experience from over 5 years of uterine artery embolization in Melbourne and from the published literature has altered the way that we approach the patient and the disease process itself. Magnetic resonance imaging is changing the patient selection and follow-up process. A strategy is required for managing patient internet information and misinformation. The causes of both success and failure are becoming understood but require more basic research. The weakness of multiple small studies with low complication rates is being addressed by the SIR registry and two large randomised trials.

Results:

Over 10,000 fibroid embolisations have been performed worldwide in at least 15 countries with over 200 articles published. The procedure is designed to cause infarction of the fibroid and is performed as a day procedure with conscious sedation. Post infarct pain requires good management. A predictor of success are hypervascular fibroids with a high signal on T2 weighted MR. MR is more useful in both selection and follow-up of patients than ultrasound but not widely available. Size alone is not a contraindication.

Overall success rates range from 81 – 94%. Menorrhagia has improved in 80-100%, bulk symptoms in 60-80% and pain reduced in 70-90% of patients.

Complications include fibroid expulsion (5%), menopausal symptoms (5%), infection (3%), and the need for hysterectomy (5%).

Over 90% of patients would recommend uterine artery embolisation to their friends. Many patients seek an interventional radiologist without a prior gynaecological opinion.

Conclusions:

Uterine artery embolization is a simple and effective therapy with a low incidence of complications. It is not for every patient and the best results are achieved with a team approach.

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FIBROIDS AND INFERTILITY, WHEN IS SURGERY INDICATED?

Dr Lyndon Hale M.B.B.S. F.R.A.C.O.G. C.R.E.I.

The impact of uterine fibroids on fertility and any subsequent surgical intervention to remove them is debatable. Widely disparate results are reported from studies comparing women with infertility and fibroids versus infertile controls. Similar disparate results are reported for the impact of myomectomy as a surgical intervention and the probability of subsequent pregnancy.

Recent prospective studies involving uterine fibroids and assisted conception outcomes have shown a significant decrease in implantation and ongoing pregnancy rates for patients with submucous and/or intramural fibroids. This effect was more pronounced with larger fibroids but noted with fibroids as small as 2cm in size. Assisted conception parameters such as duration of stimulation, common number of oocytes collected and embryos developed was not significantly different for either group. No impact on implantation was noted for the subserosal only fibroid subgroup, irrespective of their size.

An equally important question is whether the removal of fibroids result in an improvement or normalisation of fertility. When all fibroid locations are considered together, myomectomy results were widely disparate with regard to pregnancy after myomectomy.

However when submucous fibroids are considered separately, pregnancy was increased after myomectomy compared with infertile controls. Many retrospective have noted that the removal of fibroids results in improved pregnancy and implantation rates. No studies identified on a literature search reported a decrease in implantation or pregnancy result as a result of a myomectomy procedure.

In conclusion it is probable that submucous and intramural fibroids greater than 2cm in size have a significant impact upon fertility. Certainly if there is cavity distortion and/or close proximity to the endometrial cavity then removal of the fibroid in established cases of infertility is likely to result in improved outcome.

- 1 Fibroids and Infertility: a systematic review of the evidence *Obstet Gynecol Surv* 2001 Aug;56(8):483-91
- 2 Effects of myomas or prior myomectomy on in vitro fertilisation (IVF) performance *J Assist Reprod Genet* 1992 Jun;9(3):217-21
- 3 Pregnancy rates of hysteroscopic polypectomy and myomectomy in infertile women. *Obsete Gynecol* 1999 Aug;94(2):167-71

LAPAROSCOPIC MYOMECTOMY

Charles E. Miller, MD FACOG, Clinical Associate Professor, University of Illinois at Chicago

The laparoscopic approach to myomectomy is proven to be safe and to provide subsequent excellent pregnancy rates.

While myolysis, uterine artery embolization and uterine artery occlusion are all technically less demanding, little is known regarding subsequent pregnancy rates or pregnancy outcomes. Moreover, uterine artery embolization has been reported to cause a high rate of menopause in older women, secondary to involvement of ovarian blood flow. Laparotomy also has the advantage of technical ease. Unfortunately, the high risk of subsequent adhesions, especially in the case of the posterior myoma, is well documented. This does not appear to be the case with a laparoscopic approach to myomectomy.

The preoperative use of GnRH agonists prior to surgery has long been recommended. Advantages are

the ability to raise hemoglobin levels in the anemic patient and to reduce the fibroid size. However, preoperative GnRH agonist use may make dissection of the fibroid more difficult, secondary to a thickened capsule. Furthermore, small fibroids shrink even smaller, making their retrieval even more difficult.

Major complications appear to be in the range of 1 – 2%. Pregnancy rates generally range from 50 – 70% and recurrence rates are reported at 25% of women undergoing laparoscopic myomectomy.

The truly large uterine fibroid poses a unique problem in laparoscopic myomectomy. Consideration of proper instrument placement is a prerequisite. The author has recently looked back at nearly 300 laparoscopic myomectomy cases. There appears to be no increased risk when proper technique is utilized.

GUIDELINES FOR THE MANAGEMENT OF UTERINE FIBROIDS – THE EVIDENCE IS NOT POPULAR

Cindy Farquhar on behalf of the Working party for the Development of Guidelines for the Management of Uterine Fibroids Fertility Plus, National Womens' Hospital, University of Auckland, Auckland, New Zealand

Introduction

In 1998 and 1999 Guidelines for the Management of Uterine Fibroids were developed by a multidisciplinary team on behalf of the New Zealand Guidelines Group. The objective of this guideline was to provide evidence based recommendations to assist decision making for the management of those women who have uterine fibroids. It was aimed at general practitioners, and obstetricians and gynaecologists and women seeking information on the management

options for uterine fibroids. It was distributed in 2000 and also submitted to ANZJOG where it was finally published in 2001. Following the publication both bouquets and brickbats were received. In particular criticism was made about the lack of consultation with AGES and the content of several of the recommendations. This presentation will attempt to address some of the concerns about guideline development and the reasons behind the recommendations.

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NEW ADVANCES IN THE DIAGNOSIS OF ENDOMETRIOSIS

Larry Demco M.D.

The detection of endometriosis currently depends on the visualization and identification of peritoneal lesions at time of pelvic laparoscopy. With improved optics smaller lesions became visible and were described by Martin et al¹ as clear lesions or red lesions. However it is very difficult to detect all the lesions of endometriosis that may be present and as a result our ability to detect occult lesions limits our ability to irradiate the disease. Hence the patient symptoms return in 6 to 24 months and therefore require further surgery. Microscopic endometriosis, which is beyond our ability to detect visually, has always been suspected². Dr. Kert Semm³ first published and invasive technique called the thermo coagulation test to detect endometriosis in normal appearing peritoneum. He describes a technique, which involved mono-polar coagulation at 100C, which caused normal peritoneum to change from a pink to a whitish color. Endometrial tissue changes to a brown color (hemosiderin effect) and was clearly distinguished from the normal peritoneum. Other attempts at visualization of microscopic disease included peritoneal blood painting⁴ (Redwine) and painting the peritoneum with methylene blue dye. Murphy et al⁵ confirmed that invisible or microscopic endometriosis does exist. In his peritoneal specimens he found endometriosis in normal appearing peritoneal tissue some distance away from the occult lesion. Pain mapping studies also revealed that the pain expressed by the patient extended up to 27 mm onto normal appearing peritoneum⁶. This also suggested microscopic disease in normal appearing tissue. To date there has been no method to determine microscopic disease or to diagnose endometriosis in normal appearing peritoneum.

It has been established in visualization of cervical tissue at time of culposcopy, that use of the green spectrum of light enhances the detection of abnormal vasculature and aids in the diagnosis of micro-invasive disease of the cervix. With this in mind, and the use of the methylene blue dye test described earlier, it seems that spectral analysis using the blue light may allow visualization of microscopic endometriosis in normal appearing endometriosis by detecting the hemosiderin components of the endometrial lesions.

The detection of endometriosis depends on the visual identification of peritoneal lesions at time of

laparoscopy. However, it is very difficult to detect all the lesions of endometriosis that may be present in the pelvis and, as a result, our inability to detect occult disease limits our capability to eradicate the disease. Laparoscopic spectral analysis does demonstrate that occult lesions of endometriosis are more easily identified. More importantly, lesions not previously seen are also identified. These new areas, which are only visible under laparoscopic spectral analysis, are pathology positive for endometriosis. Spectral analysis also shows the neovascularization, which is described in the early development of endometrial lesions as well as the scar formation around the lesions. Seeing these new lesions, the neovascularization, and scar tissue formation enables the surgeon detect the extent of the disease. Since the destruction of the lesion depends upon our ability to direct the energy source or set the limits of surgical excision in order to vaporize or remove the entire lesion, laparoscopic spectral analysis of peritoneal lesions not only enhances the visualization of visible lesions but also reveals endometrial lesions in previously normal appearing peritoneum when using full spectrum of light. Laparoscopic spectral analysis is a noninvasive technique that plays an important role in setting the borders of treatment by vaporization or excision so as to irradiate the areas of endometriosis resulting in better outcome of our treatment.

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VIRTUAL REALITY IN LAPAROSCOPIC SURGERY

Jim Tsaltas

If virtual flight simulators were not available there would be 700 commercial aircraft disasters per year. What a thought. Training in laparoscopic surgery is still mainly confined to the operating suite. Certainly courses are available, some of us have been to animal laboratories or even sweated over exercises in a physical simulator (ie pelvi-trainer). Animal models and pelvi-trainers are a form of virtual surgery. These platforms have served as a springboard to develop true computerised laparoscopic surgery virtual reality programmes. Is this still the realm of science fiction or closer than we think? The vision of many surgeons and

trainees is to be able to learn new laparoscopic procedures on their computers and be able to perfect their technique before going near a patient.

This presentation will look at the current status of Virtual reality and discuss how this technology is and can be applied to current practice. Our own Unit at Monash, in collaboration with the Biomedical and Computer Engineering departments at Monash University have been working for some time in this field and we would like to present some of the work we have published and discuss how collaboration is the only way forward in this exciting field of science.

ANTI-ADHESIVES – WHEN YOU ARE ON A GOOD THING, STICK TO IT.

Raphael Kuhn, Consultant, Melbourne IVF and Melbourne Fibroid Clinic

Adhesives are a much greater problem than a lot of us realise. They occur in 60-90% of women who have had a major gynaecological operation, and are the main cause of intestinal obstruction, being responsible for 30-40% of cases requiring further surgery. They are also a major factor in 15-20% of cases of female infertility.

Whilst the application of microsurgical principles to "open" and laparoscopic surgery, e.g. gentle tissue handling, prevention of tissue drying and precise haemostasis reduces adhesion formation by minimizing

serosal injury, most of our traditional adjuvant therapies, e.g. leaving Hartman's solution in the peritoneal cavity at the conclusion of surgery, are without scientific basis.

Progress in adhesion prevention in the immediate future rests with barriers.

Currently available barriers including Interceed, Seprafilm, Spray gel, and Intergel will be critically appraised.

List of references and suggested reading will be provided at the conclusion of presentation.

NEWER ABLATION TECHNIQUES – ARE THEY ANY BETTER?

Peter J. Maher, Mercy Hospital for Women, Melbourne

Endometrial ablation was first reported in 1978 by Robert Neuwirth. It had a sporadic uptake during the 1980's. Vancaillie reported the use of roller ball to achieve the same end point as resection with excellent success. Roller ball ablation since its introduction in 1989 has become the gold standard against which any subsequent device is measured to establish its efficacy.

Endometrial ablation/resection enjoyed a huge success in the early 90's, at least in terms of uptake. Unfortunately, due to poor training and subsequently bad technique, results were, in general, poor and the procedure lost favour.

Poor outcomes led many surgeons to not only stop the technique but also to denigrate it as a useless procedure. Small pockets of surgeons skilled in the procedure continued to perform resection/ablation with success rates of 80 – 90%.

Instrument manufacturers, realising there was a market for a device which offered equivalent results without much surgical skill have set about to find the perfect device.

This presentation looks at procedures which are available and attempts to evaluate their position against the gold standard of roller ball endometrial ablation.

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THE ROLE OF VIDEO SURGICAL RECORDS

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Significant improvements in image capture technology have occurred over the last few years. Most camera companies now offer an imaging solution. These video and still records may be incorporated into the clinical record increasing the information available when compared with a simple handwritten note.

Video records are an addition to the clinical record and may be used also for medico-legal purposes. They

have value as an educational tool which may be useful for patients, colleagues and junior doctors in training.

The presentation will showcase some of these systems and will contrast differing features. Attention will be focused on the usefulness of these records when compared with plain images and typed notes.

ENDOMETRIOSIS: SAMPSON REVISITED

Ray Garry

The cause or causes of endometriosis remain as elusive as ever. More and more potential biochemical factors such as MMPs, angiogenic factors, immunological abnormalities and uterine muscular disturbances as well as hormonal imbalances have all been implicated. Most people consider that Sampson's retrograde menstruation is implicated in at least some forms of endometriosis. The problem is that few people have read Sampson's work and therefore the causative role attributed to Sampson is not actually what he wrote or at least Sampson believed that retrograde menstruation was only a partial explanation for the disorder with which his name has become synonymous.

Modern laparoscopic facilities and particularly extensive laparoscopic dissection of endometriosis have given us a new appreciation of the extent and distribution of the disease. Most of the disease occurs in areas rich in lymphatic and blood vessels. We know that malignant endometrium spreads down these structures. Why does benign endometriotic endometrium not spread in a similar manner? Sampson certainly thought so and a review of the literature confirms that many others also think so. I will present a detailed review of this evidence and propose yet another possible explanation for the aetiology of this most intriguing disorder.

ANATOMY-WHICH DEFECT, WHICH APPROACH? VAG, OPEN, LAP

Marcus Carey

Royal Women's Hospital, Melbourne

Pelvic organ prolapse has been estimated to be present in approximately 50% of parous women with 10-20% seeking treatment for their symptoms¹. MacLennan et al reported that 46.2% of women aged 15-97 years were experiencing or had experienced pelvic floor dysfunction². Current symptoms of prolapse, vaginal laxity during coitus and previous pelvic floor repairs were reported by 8.8%, 5.2% and 23.7% of women respectively. Boyles et al recently reported that, each year, approximately 200,000 women undergo surgery for pelvic organ prolapse in the United States³.

Anatomical Considerations

The uterus and upper one third of the vagina are held in place over the levator plate by the fibres of the parametrium (cardinal and uterosacral ligaments) and paracolpium. The fibres of the parametrium and upper paracolpium arise from a broad area on the pelvic side wall over the fascia of the piriformis muscle, sacroiliac joint and lateral sacrum. These fibres which represent condensations in the endopelvic fascia act like suspensory ligaments and run in a mainly vertical direction to insert into lateral upper third of the vagina and lateral and posterolateral aspect of the cervical portion of the uterus.

The muscular levator plate provides indirect support for the upper genital tract by acting as a platform against which the upper vagina and other pelvic viscera are compressed during rises in intra-abdominal pressure. The levator plate is formed by the fusion of the right and left bellies of the levator ani muscle behind the rectum and anterior to the coccyx. Subluxation of the levator plate will cause it to act like a slide down which the rectum and upper genital tract may descend with rises in intra-abdominal pressure.

The middle third of the vagina gains attachment laterally to the pelvic wall along the arcus tendineus from the pubic bone to the ischial spine. It is debatable whether the supportive layer for the bladder base and urethra is the pubocervical fascia or vagina alone. The lateral vaginal supports can be visualized abdominally at the time of retropubic surgery for stress incontinence. Vaginally, these lateral vaginal attachments result in lateral vaginal grooves or sulci.

Surgical Management

The main defect causing vault or marked uterovaginal prolapse is the failure of the upper genital

tract supporting mechanism. Vault prolapse is a late complication of hysterectomy with an incidence of below 5% and occurs in equal numbers following abdominal and vaginal hysterectomy⁴. The principles governing successful surgery are the achievement of effective and sustained vault or uterine support, obliteration of enterocele sac and repair of coexistent cystocele and rectocele. Coexistent cystocele and/or rectocele is present in approximately two thirds of women with vault prolapse and these women require concomitant lower genital tract repair procedures.

Vaginal Surgery for Vault and Marked Uterovaginal Prolapse

Transvaginal prolapse repair offers many reported advantages over the abdominal approach particularly in patients with poor surgical risk factors or who are elderly and frail. Advocates for transvaginal prolapse surgery have asserted that this approach allows repair of all pelvic defects simultaneously without having to reposition the patient. However, use of pneumatic stirrups such as Allen stirrups allows the surgeon to easily combine abdominal and vaginal surgery without have to reposition or re-drape the patient.

Sacrospinous Ligament Fixation

The sacrospinous fixation popularized by Randall and Nichols is indicated for posthysterectomy vault prolapse or enterocele, suspension of the vault at the time of vaginal hysterectomy and uterine fixation to the sacrospinous ligament when uterine preservation is desired. Sacrospinous fixation is usually performed unilaterally but may be performed bilaterally if sufficient vaginal width at the vault is present. A number of techniques have been described to place sutures into the sacrospinous ligament. We use the Miya hook, which allows sutures to be safely placed into the sacrospinous ligament using direct palpation of the distinct anatomical landmarks of the ischial spine and sacrospinous ligament⁴.

Comparative Studies of Vaginal Surgery for Vault and Marked Uterovaginal Prolapse

Sze and Karram extensively reviewed vaginal surgery for vault prolapse in 1997⁵. They identified 34 peer-review journal articles. Of 1062 women who underwent sacrospinous fixation and who were available for follow-up, 193 (18%) developed further prolapse. There were 32 vault eversions, 81 cystoceles, 24 rectoceles and

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56 unspecified prolapses following the initial sacrospinous fixation. A total of 155 women were treated by iliococcygeal fixation with 13 (8%) experiencing recurrent prolapse. The vault was the site of recurrence in 2 women, anterior wall in 8 women and posterior wall in 3 women. The McCall culdoplasty was used to treat 322 women and recurrent prolapse occurred in 34 (11%) cases. There were 9 vault prolapses, 2 cystoceles, 11 rectoceles and 12 unspecified prolapses following this procedure. In this review the authors commented on the high success rate and low morbidity and mortality rates associated with vaginal surgery for the treatment of vault prolapse.

Abdominal Surgery

The sacral colpopexy involves suspending the vault from the sacral promontory with synthetic mesh or biological materials. Surgery is performed through a low Pfannensteil incision. Bladder and rectum are dissected off the vagina. The anterior dissection extends from vault to around half way down the anterior vaginal wall. Posteriorly, the dissections extends from vault into the rectovaginal septum and the peritoneal dissection is continued along the right of the rectosigmoid to reach the sacral promontory. The mesh is sutured to the upper two thirds of the posterior vagina and upper half of the anterior vaginal wall. The mesh or fascia is then sutured to the sacral promontory. The vagina is suspended from the sacral promontory without tension to reduce the risk of postoperative stress incontinence. Peritoneum is closed over the mesh. The retropubic space is then entered and a colposuspension or paravaginal repair performed depending on the presence of a coexisting cystocele or stress incontinence. Usually a perineorrhaphy and low posterior repair is required to complete the pelvic reconstruction procedure.

Bensen et al reported the results of an RCT comparing vaginal with abdominal reconstructive surgery for prolapse⁶. Forty-eight women underwent bilateral sacrospinous fixation and paravaginal repair, and 40 underwent abdominal sacral colpopexy and paravaginal repair. In the vaginal group surgical outcome was optimal in 29%, satisfactory in 38% and unsatisfactory in 33%. In the abdominal surgical outcome was optimal in 58%, satisfactory in 26% and unsatisfactory in 16%. They concluded abdominal surgery was more effective than vaginal surgery for correction of pelvic support defects.

Surgery for Anterior Vaginal Prolapse

Anterior vaginal wall prolapse may be caused by midline or lateral paravaginal defects. If a paravaginal defect is present the aim of surgery is to reattach the anteriolateral vagina with sutures to the white line of the pelvic side wall. This can be achieved either

abdominally through the retropubic space or through a vaginal incision.

The retropubic approach is well known to those gynaecologists who use the Burch colposuspension for stress incontinence. In the Burch colposuspension three sutures are placed into the lateral vagina at the bladder neck and above, suspending the lateral vagina to the iliopectineal ligament. Although cystocele is frequently cured the upper vagina remains unsupported with a significant risk of postoperative development of high cystocele and vault prolapse in some patients. The iliopectineal ligament is too high for direct attachment of the vagina in most women, which may result in over correction of the anterior vaginal wall with possible development of postoperative voiding difficulty and posterior wall prolapse. Suspension sutures should be tied without tension with a suture gap between vagina and ligament for a more correct anatomical result. Burch colposuspension and paravaginal repair combined with an abdominal sacral colpopexy with anterior placement of mesh provides optimal anterior vaginal wall support when cystocele and vault prolapse occur together.

Surgery for Posterior Vaginal Prolapse

Traditionally, the posterior vaginal repair or posterior colporrhaphy involves the plication of recto-vaginal fascia and trimming of excess vaginal epithelium. Recently, discrete fascial defects have been described and rectocele repairs aimed at treating these defects have been reported. Mesh augmentation of rectocele repairs has been associated with high rates of dyspareunia.

Laparoscopic Prolapse Surgery

The laparoscopic approach for sacral colpopexy and paravaginal repair procedures have been reported with success rates comparable with the open technique. Mahendran et al reported the results of 29 women undergoing laparoscopic sacral colpopexy⁷. Further surgery was required for 4 patients with rectoceles and one patient developed recurrent vault prolapse. Wattiez et al reported their technique and experience with laparoscopic sacral colpopexy⁸. They extol the tremendous potential of the laparoscopic approach to pelvic organ prolapse. They note that the operating time is longer for laparoscopic surgery and the surgeon must be highly experienced.

Maher et al reported on the outcome of 43 women from our unit who underwent laparoscopic suture hysteropexy for the management of symptomatic uterine prolapse to or beyond the introitus⁹. All women were evaluated independently by a non-surgical co-author at least 6 months following surgery. Symptoms of prolapse were observed in 19% of women and 21% demonstrated objective evidence of uterine prolapse at review.

Conclusion

In our unit, vaginal and abdominal approaches for genital prolapse are used in approximately equal numbers. Laproscopic surgery is used mainly for younger women desiring this approach. We have found the abdominal approach to be more durable than vaginal surgery as there is a much broader area of support for the upper genital tract. In women with vault prolapse we usually recommend abdominal surgery for those under 70 years who are sexually active and especially if they have undergone prior failed surgery. We favour the vaginal approach for primary prolapse surgery and for older or medically compromised women. In recent years we have increasingly used either mesh to reinforce our repair procedures in patients who have undergone prior failed surgery. We have also noticed that more women are wishing to avoid hysterectomy. We have had to modify our approach to surgery in these cases by employing variously: sacrospinous ligament uterine fixation; abdominal sacral hysteropexy; or laparoscopic suture hysteropexy.

Every pelvic reconstructive surgeon should become proficient in both vaginal and abdominal surgery in managing genital prolapse and should generally adhere to the following principles governing the aims of reconstructive pelvic surgery:

- Relieve symptoms;
- Correct the prolapse by restoring the normal pelvic anatomy where feasible;
- Correct co-existing urinary, coital and lower bowel dysfunction;
- Avoid the development of urinary, coital and lower bowel dysfunction;
- Obtain a durable result, which in some cases may require the use of prosthetic materials.

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LAPAROSCOPIC PELVIC FLOOR REPAIR: FINALLY THE RESULTS

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Pelvic organ prolapse is an increasing major health issue for women, with up to 11% of women requiring surgical correction and a further 30-40% needing reoperation.^{1,2} It is estimated that the demand for service related to pelvic organ prolapse will outstrip population growth by a factor of 2 as more patients and health professionals become aware of the impact and treatments of the condition³.

Over 70 procedures have been described for the correction of pelvic organ prolapse, of which many have resulted in distortion and scarring of the vagina. The short and long-term success rates of these procedures has been variable often accompanied by considerable morbidity.

The laparoscopic approach to the pelvic organ prolapse allows improved visualisation of the supporting structures and an increased understanding of the functional anatomy of the dynamic unit that is the pelvic floor.

Since our original description⁴ of the laparoscopic enterocele repair the procedure has evolved to encompass the correction of rectocele and apical defects. During this evolution we have moved from excisional and reparative surgery toward conservative and true anatomical defect repair.

Between 1993 and 2002 a total of 693 patients have had pelvic floor reconstructive procedures performed. Two hundred and thirty one of these women had interventions performed primarily for urinary

incontinence, the remainder having surgery for the correction of pelvic organ support defects.

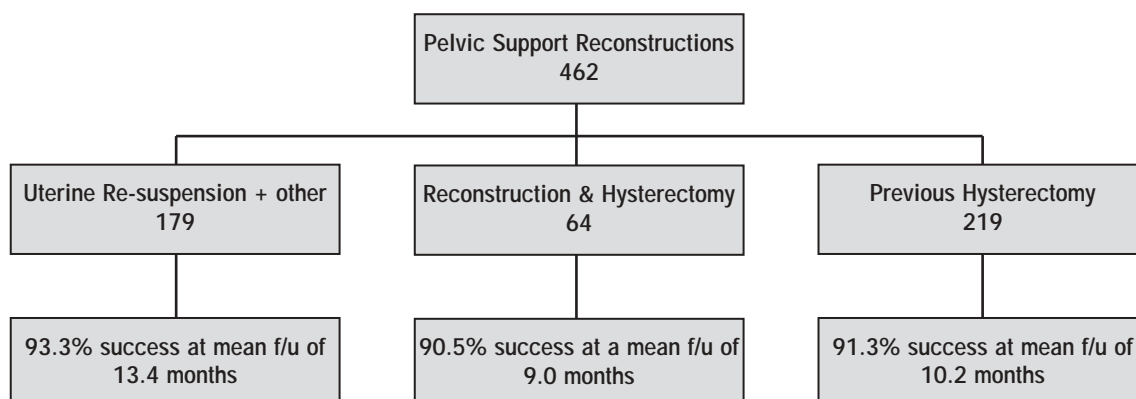
For descriptive purposes the reconstructive procedures will be divided into those where the uterus was preserved (179), where a hysterectomy was performed (64) and where previous uterine extirpation was carried out (219).

The flow chart summarises the short term success of these procedures but longer-term evaluation is currently being undertaken.

These procedures were associated with few major complications and overall morbidity was low. We present our data.

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VAULT SUSPENSION – THE EVIDENCE

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The incidence of post hysterectomy vaginal vault prolapse requiring surgery has been estimated at 36 per 10,000 person years. The risk increased cumulatively with years following hysterectomy and when the initial hysterectomy was performed for genital prolapse.¹ The surgical management of the post hysterectomy vaginal vault prolapse remains controversial. The vaginal vault can be re-supported either by the abdominal or vaginal approaches. The abdominal approach may be performed as an opened or laparoscopic procedure using mesh to suspend the vaginal vault to the sacrum or by suturing the vaginal vault either directly to the sacrum or to the uterosacral ligament complex. The vaginal approach can be used to attach the vaginal vault directly to the sacrospinous ligament iliococcygeal fascia or the remnants of the lateral cervical/uterosacral ligament complex.

The abdominal approach to vaginal vault prolapse using the sacral colpopexy was first described by Lane in 1962. In 1968 Richter described the vaginal sacrospinous colpopexy for suspension of the vaginal vault. This procedure was popularised by Randall and Nicholls². A review of the numerous retrospective study comparing the vaginal sacrospinous colpopexy and the abdominal sacrocolpopexy would suggest that both are safe and effective procedures, although Benson et al³ in a prospective evaluation reported the abdominal sacrocolpopexy was superior the vaginal sacrospinous ligament in the management of pelvic organ prolapse. In Benson's study half of the women studied had a uterovaginal prolapse rather than vault prolapse and the surgical outcome was adversely effected by the use of the needle suspension to treat stress incontinence in the vaginal group. In a prospective randomised study of 95 women with vaginal vault prolapse⁴ (Maher et al 2001) and a mean follow up period of 2 years we found that the subjective success rate was 94% in the abdominal and 91% in the vaginal group (P= 0.19). The objective success rate was 76% in the abdominal and 69% in vaginal group (P = 0.48). The abdominal approach was associated with a longer operating time, slower return to activities of daily living and a greater cost than the sacrospinous colpopexy (P >0.01) both surgery significantly improved quality of life.

There are no good comparative prospective studies of vaginal surgery for vault prolapse. Sze and Karram reviewed the literature on vaginal surgery for vault

prolapse in 1997 and compared the sacrospinous suspension, the iliococcygeal fixation and the McCall culdoplasty. They found a high success rate and low morbidity with these procedures. This meta-analysis will be discussed.

Maher et al valued 128 women who had undergone sacrospinous or iliococcygeal fixation for vaginal vault prolapse in our Department between 1994 and 1998. Although, satisfaction with surgery was high in both groups, recurrent prolapse was objectively found in a third of women following the sacrospinous fixation and almost a half following iliococcygeal fixation.

Colombo and Milani reported the results of a case control study of 62 women who underwent sacrospinous fixation and 62 women who underwent modified McCall culdoplasty during vaginal hysterectomy and repair. Recurrent prolapse was present in 27% after sacrospinous fixation and 15% following the McCall culdoplasty. The authors concluded that sacrospinous ligament fixation is not recommended as a prophylactic measure for women undergoing surgery for uterovaginal prolapse.

In practice, both vaginal and abdominal approaches for vaginal vault prolapse are required, depending on the clinical circumstances. No one operation will be appropriate in all patients and the surgeon should modify his approach to suite the patient's needs.

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