Gynaecologic surgery from uncertainty to science: evidence-based surgery is no passing fad

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BACKGROUND: The randomized controlled trial (RCT) is the least biased measure of the effectiveness of interventions, including surgical interventions. The aim was to review the available evidence base in gynaecologic surgery, to assess what progress has been made and to determine gaps in the evidence for clinical decision-making. METHODS: Systematic reviews involving gynaecological surgery interventions were extracted from the Cochrane Database of Systematic Reviews (Issue 2, 2007) and data were extracted for key primary outcomes from each of the randomized trials in the reviews. The reviews were categorized as to whether they had provided evidence of effectiveness for pre-defined outcomes of most relevance to patients. RESULTS: Of 371 reviews or protocols published on the Cochrane Database of Systematic Reviews (Issue 2, 2007), only 30 were completed reviews assessing surgical interventions. Seven reviews concluded there was evidence of a significant effect (whether beneficial or harmful) of the interventions studied for pre-defined primary outcomes; 11 reviews concluded there was some evidence of significant effects for primary outcomes along with some gaps for primary outcomes; 12 reviews concluded insufficient evidence of effectiveness. Common themes of unique methodological challenges and pitfalls with trials of surgical interventions were apparent. CONCLUSIONS: Cochrane reviews have gone a long way to establishing a sound evidence base in gynaecologic surgery: some gaps in the evidence have been eliminated and others highlighted. In general, gynaecology has been a specialty where surgical interventions have been well exposed to the scrutiny of RCTs compared with other surgical specialties.

Keywords: Cochrane; gynaecology; randomized controlled trials; surgery; systematic review

Introduction

Gynaecology, following the lead of perinatology, is a specialty in which interventions have been exposed to the scrutiny of the randomized controlled trial (RCT) more readily than in many other specialties (Johnson et al., 2003). Indeed, subfertility was one of the first fields where the need to base practice on evidence from robust randomized trials was highlighted, rather than to conduct a ‘cookery based’ approach to practice (Vandekerckhove et al., 1993). Has a similar phenomenon occurred in surgical specialties, including ‘gynaecologic surgery from uncertainty to science’? Traditionally in surgical specialties, a non-evidence-based approach to practice has been prevalent. To call this ‘butchery based’ might be emotive, although no inference should be taken that the surgeons involved were not skilful, but there has been a tendency to adopt the latest surgical technique because it seems rational (or worse, because it demonstrates the technical skill of the surgeon) rather than because it fulfils the stringent criteria for effectiveness that we now demand for non-surgical interventions. Our view, for what it is worth, is that gynaecologists have been less guilty of this phenomenon than other surgical specialists. This is probably linked to the origins of evidence-based practice in the specialty of obstetrics and gynaecology (Johnson et al., 2003), and our related study reports in detail on the evolution of methodological quality of the randomized trials to which the present study relates (Selman et al., 2008).

The Cochrane Database of Systematic Reviews provides up-to-date evidence on health care, where bias is minimized. In addition, systematic reviews can also identify ‘gaps’ where there is insufficient or no evidence, or where the quality of evidence is insufficient. (Johnson et al., 2003). Elaborate grading systems for evidence exist, although these have largely been designed for formulation of practice guideline recommendations (Guyatt et al. 2006).
The aim of this study was to assess qualitatively to what extent the Cochrane review groups whose scope covers gynaecologic surgical interventions have been able to provide evidence coverage of this field and where gaps in the evidence remain.

Materials and Methods

The relevant gynaecology review groups (Gynaecological Cancer, Incontinence, Fertility Regulation, Menstrual Disorders and Subfertility Groups) with reviews on the Cochrane Database of Systematic Reviews (Issue 2, 2007) were searched for titles suggesting assessment of a surgical intervention. After confirmation that trials did indeed assess a gynaecologic surgical technique, each review was subgrouped as oncology, urogynaecology, fertility regulation, menstrual disorders, subfertility or other benign gynaecologic surgery.

We had defined a priori a hierarchy of primary outcomes by consensus among the authors of this paper, to be extracted from each systematic review (Selman et al., 2008), based on what we considered to be outcomes of relevance to patients, as follows.

(i) For oncology reviews: disease eradication;
(ii) For incontinence reviews: subjective ‘cure’ or dryness (objective ‘cure’ if not available) in reviews of incontinence; for prolapse reviews: subjective ‘cure’ or prevention of recurrent prolapse (objective if not available);
(iii) For fertility regulation reviews: uncomplicated termination of pregnancy or attainment of sterilization;
(iv) For menstrual disorders reviews: subjective ‘cure’ of heavy menstrual bleeding (HMB) or satisfaction with treatment (objective reduction of HMB if not available);
(v) For subfertility reviews: live birth (or clinical pregnancy if data on live birth were not available);
(vi) For benign gynaecologic surgery, reviews were assessed and a primary outcome allocated a priori as follows:

1. return to normal activities (in the absence of extensive quality of life data) for hysterectomy;
2. live birth (or pregnancy) or pain (or recurrent adhesions if not available) for adhesion prevention agents;
3. elimination of ectopic pregnancy;
4. pain for endometriosis surgery (including endometriomas) and neuroablation.

If such outcomes were not available, the primary outcomes selected by review authors were considered and a primary outcome agreed upon by consensus among authors of this paper.

The following data were collected for each review:

(i) date of the most recent search for trials;
(ii) the number of trials and participants contributing to the primary outcomes;
(iii) whether there was evidence of a significant difference (whether beneficial or harmful) of the interventions studied for pre-specified primary outcomes from meta-analysis (evidence category allocation ‘E’ for ‘evidence of an effect’), or simply insufficient evidence of effectiveness or harm (evidence category allocation ‘G’ for ‘gap in evidence’). The term ‘relative effectiveness’ was used when two interventions were compared and the term ‘effectiveness’ was used when the treatment was compared with either placebo or no treatment. Evidence category ‘E&G’ was allocated when there was some evidence of significant effects along with some gaps for primary outcomes.

(iv) Methodological difficulties highlighted by the reviewers were also noted.

Results

Thirty completed reviews assessing surgical interventions, from a total of 371 reviews and protocols in gynaecologic oncology, urogynaecology, fertility regulation, menstrual disorders and subfertility, were published on the Cochrane Library. These comprised:

(i) two of 84 reviews (n = 47) and protocols (n = 37) from the Gynaecological Cancer Group (Ansink and van der Velden, 2000), only one of which included any RCTs (Martin-Hirsch et al., 2000);
(ii) six of 69 reviews (n = 51) and protocols (n = 18) from the Incontinence Group (Glazener and Cooper, 2001; Moehrer et al., 2002; Maher et al., 2004; Bezerra et al., 2005; Lapitan et al., 2005);
(iii) four of 53 reviews (n = 46) and protocols (n = 7) from the Fertility Regulation Group (Kulier et al. 2001, 2004; Nardin et al. 2003; Say et al., 2005);
(iv) eighteen of 165 reviews (n = 113) and protocols (n = 52) from the Menstrual Disorders and Subfertility Group, including three menstrual disorders surgery reviews (Lethaby et al., 2000, 2005; Marjoribanks et al., 2006), six subfertility surgery reviews (Johnson and Watson, 1999; Jacobson et al., 2002; Johnson et al., 2004; Farquhar et al., 2005; Ahmad et al., 2006; Van Peperstraten et al., 2006) and nine otherwise uncategorized reviews of benign gynaecologic surgery (Farquhar et al., 2000; Jacobson et al., 2001; Hart et al., 2005; Medeiros et al., 2005; Proctor et al., 2005; Johnson et al., 2006; Lethaby et al., 2006; Metwally et al., 2006; Hajej et al., 2007)

The findings of these reviews of gynaecologic surgery and our extracted conclusions are summarized in Tables I–VI. Overall, from the 30 gynaecologic surgery reviews, there was evidence of effectiveness (or relative effectiveness) of the interventions from primary trial data or from meta-analysis of trial data for our a priori defined primary outcomes in seven reviews where clear answers to the clinical questions posed were found (evidence category E) and in a further 11 reviews where evidence of effectiveness for some comparisons or outcomes were found in conjunction with some comparisons or outcomes for which there was insufficient evidence (evidence category E&G). There was insufficient evidence (or a ‘gap’ in evidence) of effectiveness in 12 reviews (evidence category G).

Table VII shows a practical categorization for the various interventions assessed in the 30 gynaecologic surgery reviews. On the basis of this system, 19 recommendations would be that the interventions are likely to show benefit, with 21 recommendations that interventions are likely to be harmful or ineffective (with some duplication from the previous 19 recommendations in the case of interventions whose relative efficacy was found to be inferior to another intervention) and only 13 interventions where the interventions are of unknown benefit.
Table 1. Cochrane reviews of gynaecologic cancer surgery.

<table>
<thead>
<tr>
<th>Review title</th>
<th>Included RCTs</th>
<th>Last update</th>
<th>Conclusions for primary outcomes (evidence category E, G or E&amp;G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical interventions for early squamous cell carcinoma of the vulva (Ansink and van der Velden, 2000)</td>
<td>0</td>
<td>October 1999</td>
<td>Two observational studies only (G)</td>
</tr>
<tr>
<td>Surgery for cervical intraepithelial neoplasia (Martin-Hirsch et al., 2000)</td>
<td>28</td>
<td>July 1999</td>
<td>No significant differences in disease eradication for seven techniques (knife cone biopsy, laser conization, LLETZ, laser ablation, cryotherapy: single and double freeze, radical diathermy) (G)</td>
</tr>
</tbody>
</table>

For Tables I–VI, figures in brackets refer to individual comparisons. Category E, ‘Evidence’ of effectiveness from meta-analysis; Category G, insufficient evidence (or ‘gap’ in the evidence); Category E&G, combination of evidence of effectiveness for one primary outcome and a gap in the evidence for another primary outcome; E, ‘Evidence’ of effectiveness from RCTs; G, ‘Gap’ in evidence from RCTs; LLETZ, large loop excision of the transformation zone; RCT, randomised controlled trial.

Discussion

Systematic reviews of gynaecologic surgical interventions are under-represented in Cochrane review groups whose scope covers the breadth of gynaecology. This probably reflects the methodological difficulties with conducting randomized trials of surgical interventions. The surprisingly small number of surgical RCTs was most striking in gynaecologic cancer treatment, in which a strong evidence base for techniques of surgical removal of cancer might be expected. This may be due in part to a reluctance of patients with cancer to submit to randomization, difficulties with obtaining ethical approval where a patient with cancer could be randomized to not having the cancer surgically removed, and a discomfort among gynaecologic oncology surgeons to admit to being in equipoise. We have disproved the widely held belief that a clear answer to a clinical dilemma is seldom the case from RCTs or meta-analysis of RCT results, in our finding that a reasonable proportion (60%) of all Cochrane reviews of gynaecologic surgical interventions were able to find evidence of effectiveness or superior relative effectiveness of these interventions for at least some primary outcomes—this figure was 32% for a similar analysis in Cochrane subfertility reviews in 2003 (Johnson et al., 2003). Some RCTs assessing surgical interventions will have been excluded from this study because they have not yet been included in Cochrane reviews, but such evidence may remain difficult for the average clinician to reach (as there is currently much more relevant literature than an individual clinician can reasonably expect to absorb).

The approach we have used to summarize the level of evidence provided for an intervention (Table VII) can be utilized for guiding practice in gynaecologic surgery. For strong evidence, where the benefits clearly outweigh the risks, patients will commonly make the same choices and surgeons can recommend the intervention with confidence. For weak evidence, patient choice will differ and here surgeons must communicate the evidence with a particular emphasis on patients’ individual needs. An example of one such recently published guideline is for laparoscopic uterosacral nerve ablation for the treatment of chronic pelvic pain (http://guidance.nice.org.uk/IPG234).

Pitfalls with systematic reviews have been highlighted (Farquar and Vail, 2006). In common with trials and systematic reviews of medical interventions, clinical trials and systematic reviews of RCTs in gynaecologic surgery are prone to difficulties with study quality, funding bias, publication bias, reliance on outcomes of little help in clinical decision-making, analysis errors and incorrect use of evidence statements in conclusions. However, surgical trials and systematic reviews have their own unique pitfalls, including a lower threshold for limitations to completion of trials, more limitations to broad applicability of trial results, surgical reputation conflict of interest, in addition to design problems, such as the performance bias resulting from inability to employ blinding (especially concerning subjective outcomes).

There are undoubtedly more confounding variables in surgical RCTs than in the more straightforward A versus B comparison that RCTs address in assessing the effectiveness of medical interventions, including variation in expertise of surgeons with different operations leading to an almost unavoidable confounding surgeon effect. For example, in the largest RCT of laparoscopic versus abdominal or vaginal hysterectomy (Garry et al., 2004), surgeons were required to have performed only 20 laparoscopic hysterectomies prior to participation in the trial; a similar problem occurred in the first RCT comparing laparoscopic versus open colposuspension (Burton, 1999), where there was a requirement for surgeons to have performed only 15 laparoscopic colposuspensions (an operation requiring the highest level of laparoscopic surgical expertise) prior to participation, although they would probably have vast experience of the more traditional open surgical approach. It is recognized that the learning curve for these complex laparoscopic surgical procedures may be exceptionally long, where the “first couple of hundred” advanced laparoscopic procedures appear to be more hazardous than the next thousand” cases in any surgeon’s series (Johnson, 2006). Conversely, surgeons participating in trials may be enthusiasts or innovators, so they may not be representative of all surgeons. Major adverse events in surgery are fortunately rare, but RCTs are therefore not often large enough to detect rare adverse events. For example, the ureteric injury rate in the systematic review of RCTs of women randomized to laparoscopic hysterectomy was 1 in 88, compared with 1 in 512 women randomized to abdominal hysterectomy, but this difference fell short of statistical significance (Johnson et al., 2005).
These difficulties with surgical RCTs have led some to suggest that RCTs have little or no place in the evaluation of surgical interventions (Black, 1999), implying that factors other than RCT evidence, particularly training and expertise among surgeons, patient preferences or even cost of treatments, are more important in determining surgical approach. It would, however, in our opinion, present some danger to introduce new surgical procedures without RCT scrutiny of these new operations versus the current gold standard treatments, as the RCT is the most reliable indicator of the effectiveness of an intervention, whether medical or surgical. Of course, RCT evidence must be integrated with individual surgical expertise in evidence-based surgical practice. The other types of study design (such as case series, even with very large numbers, cohort studies or case-controlled studies), so often relied upon to assess surgical interventions, are prone to unacceptable bias.

A number of prerequisites for surgical RCTs will vastly improve the evidence base in the future. First, pragmatic trials with non-restrictive entry criteria will improve recruitment and generalizability of trial results. Second, only when we collaborate in large multi-centre RCTs of gynaecologic surgical interventions will we have sufficient data to inform evidence-based practice in gynaecologic surgery.

### Table II. Cochrane reviews of urogynaecologic surgery.

<table>
<thead>
<tr>
<th>Review title</th>
<th>Included RCTs</th>
<th>No. of participants</th>
<th>Last update</th>
<th>Conclusions for primary outcomes (evidence category E, G, or E&amp;G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior vaginal repair for urinary incontinence in women (Glazener and Cooper 2001)</td>
<td>9</td>
<td>932</td>
<td>January 2001</td>
<td>Anterior vaginal repair is less effective than open abdominal retropubic suspension operations. Has insufficient evidence of effectiveness versus physical therapy. No RCTs examined anterior vaginal repair versus suburethral sling operations.</td>
</tr>
<tr>
<td>Bladder neck needle suspension for urinary incontinence in women (Glazener and Cooper, 2004)</td>
<td>8</td>
<td>784</td>
<td>April 2004</td>
<td>Needle suspension is less effective than open abdominal retropubic suspension. Has insufficient evidence of effectiveness versus suburethral slings. No RCTs examined needle suspension versus conservative management.</td>
</tr>
<tr>
<td>Traditional suburethral sling operations for urinary incontinence in women (Bezerra et al., 2005)</td>
<td>13</td>
<td>760</td>
<td>July 2005</td>
<td>No significant differences were found between slings and open abdominal retropubic suspension. Needle suspension. Nor among different types of suburethral slings, but slings are more effective than anticholinergic medication. No RCTs compared slings with laparoscopic retropubic suspension, anterior repair, peri-urethral injections or artificial sphincters (G). Laparoscopic colposuspension versus open colposuspension gives similar subjective impression of cure at 18 months versus open colposuspension.</td>
</tr>
<tr>
<td>Laparoscopic colposuspension for urinary incontinence in women (Moehret et al., 2002)</td>
<td>21</td>
<td></td>
<td>July 2006</td>
<td>Laparoscopic colposuspension versus newer self-fixing sling devices gives similar subjective cure rates. Two paravaginal sutures are more effective than a single suture in improving subjective cure rates (E&amp;G). Abdominal sacral colpopexy is more effective than vaginal sacrospinous colpopexy in reducing recurrent vault prolapse and dyspareunia. Supplementation with Vicryl mesh overlay is effective in reducing recurrent cystocele at anterior vaginal repair. Vaginal repair is more effective than transanal repair for posterior vaginal wall prolapse. Insufficient evidence to assess impact of prolapse surgery on continence issues, although addition of tension free vaginal tape to endopelvic fascia placation is effective in reducing postoperative stress incontinence (E&amp;G).</td>
</tr>
<tr>
<td>Surgical management of pelvic organ prolapse in women (Maher et al., 2004)</td>
<td>14</td>
<td>1004</td>
<td>October 2004</td>
<td>Laparoscopic colposuspension versus open colposuspension.</td>
</tr>
</tbody>
</table>
Table IV. Cochrane reviews of surgery for menstrual disorders.

<table>
<thead>
<tr>
<th>Review title</th>
<th>Included RCTs</th>
<th>No. of participants</th>
<th>Last update</th>
<th>Conclusions for primary outcomes (evidence category E, G or E&amp;G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endometrial destruction techniques for heavy menstrual bleeding (Lethaby et al., 2005)</td>
<td>19</td>
<td>3285</td>
<td>October 2001</td>
<td>No significant differences for Vacuum aspiration versus dilation and curettage Flexible versus rigid vacuum aspiration cannulae (G)</td>
</tr>
<tr>
<td>Endometrial resection and ablation versus hysterectomy for heavy menstrual bleeding (Lethaby et al., 2000)</td>
<td>5</td>
<td>752</td>
<td>April 1999</td>
<td>Abortion is completed more often and is less painful for suction termination of pregnancy versus prostaglandins (E)</td>
</tr>
<tr>
<td>Surgery versus medical therapy for heavy menstrual bleeding (Marjoribanks et al., 2006)</td>
<td>8</td>
<td>821</td>
<td>April 2006</td>
<td>Insufficient evidence of differences in effectiveness between different endometrial destruction techniques (G)</td>
</tr>
</tbody>
</table>

Table V. Cochrane reviews of subfertility surgery.

<table>
<thead>
<tr>
<th>Review title</th>
<th>Included RCTs</th>
<th>No. of participants</th>
<th>Last update</th>
<th>Conclusions for primary outcomes (evidence category E, G or E&amp;G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Techniques for pelvic surgery in subfertility (Ahmad et al., 2006)</td>
<td>7</td>
<td>437</td>
<td>April 2006</td>
<td>No evidence of superior relative effectiveness of Carbon dioxide laser versus standard techniques in adhesiolysis and salpingostomy Open versus laparoscopic salpingosomatolysis for tubal patency Different techniques of salpingostomy Thermocoagulation versus electrocoagulation in adhesiolysis No RCTs examining infertility surgery versus no treatment or alternative treatment Use of magnification in tubal surgery (G)</td>
</tr>
<tr>
<td>Laparoscopic surgery for subfertility associated with endometriosis (Jacobson et al., 2002)</td>
<td>2</td>
<td>437</td>
<td>October 2005</td>
<td>Laparoscopic surgery significantly improves the odds live birth plus ongoing pregnancy (E)</td>
</tr>
<tr>
<td>Surgical treatment for tubal disease in women due to undergo IVF (Johnson et al., 2004)</td>
<td>3</td>
<td>295</td>
<td>July 2004</td>
<td>Laparoscopic salpingectomy for hydrosalpinges prior to IVF significantly improves the odds of pregnancy and live birth (E)</td>
</tr>
<tr>
<td>Laparoscopic drilling by diathermy or laser for ovulation induction in anovulatory polycystic ovary syndrome (Farquhar et al., 2005)</td>
<td>6</td>
<td>313</td>
<td>July 2005</td>
<td>No significant difference in pregnancy rates between laparoscopic ovarian drilling (6–12 months follow-up) and gonadotrophin injections (3–6 cycles); significantly fewer multiple pregnancies with ovarian drilling (G)</td>
</tr>
<tr>
<td>Postoperative procedures for improving fertility following pelvic reproductive surgery (Johnson and Watson, 1999)</td>
<td>5</td>
<td>608</td>
<td>April 2007</td>
<td>No evidence of effectiveness for Postoperative hydrotubation Second-look laparoscopy with adhesiolysis (G)</td>
</tr>
<tr>
<td>Techniques for surgical retrieval of sperm prior to ICSI for azoospermia (Van Peperstraten et al., 2006)*</td>
<td>2</td>
<td>98</td>
<td>April 2005</td>
<td>Insufficient evidence to recommend any particular technique for surgical retrieval of sperm over another (G)</td>
</tr>
</tbody>
</table>

* Surgical procedures performed on men by fertility specialists.
power to find modest improvements that may add up to clinically meaningful improved quality of life, more babies born to infertile couples or even lives saved. Such an approach enhances generalizability and speeds recruitment, thus avoiding the problem seen with laparoscopic colposuspension, an operative intervention that became

<table>
<thead>
<tr>
<th>Review title (Authors)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Surgical approach to hysterectomy for benign gynaecological disease (Johnson et al., 2006)</td>
<td>27</td>
<td>3643</td>
<td>April 2006</td>
<td>Both vaginal and laparoscopic hysterectomy are associated with speedier return to normal activities compared to abdominal hysterectomy, at a cost, in the case of laparoscopic hysterectomy, of increased surgical time and more urinary tract injuries No long-term outcomes reported (E&amp;G)</td>
</tr>
<tr>
<td>Total versus subtotal hysterectomy for benign gynaecological disease (Lethaby et al., 2006)</td>
<td>3</td>
<td>733</td>
<td>April 2006</td>
<td>Subtotal hysterectomy has Shorter surgery Less blood-loss Less postoperative febrile morbidity More ongoing cyclical bleeding, than total hysterectomy No significant differences in speed of recovery or other complications (E&amp;G)</td>
</tr>
<tr>
<td>Laparoscopy versus laparotomy for benign ovarian tumours (Medeiros et al., 2005)</td>
<td>6</td>
<td>324</td>
<td>July 2005</td>
<td>Laparoscopic approach shows significant improvement in Pain scores Reduced chance of all postoperative complications, at the cost of increased operative time (E)</td>
</tr>
<tr>
<td>Interventions for tubal ectopic pregnancy (Hajenius et al., 2007)</td>
<td>35 (5 examining surgical interventions)</td>
<td>351 from 5 RCTs</td>
<td>January 2000</td>
<td>Laparoscopic conservative surgery is less effective than open surgery in elimination of trophoblastic tissue, but has comparable subsequent tubal patency rate and number of subsequent intrauterine and ectopic pregnancies, but is associated with speedier recovery and lower costs Laparoscopic salpingostomy alone is less effective than when combined with a single shot methotrexate injection Local methotrexate injection is less effective than laparoscopic conservative surgery in the elimination of ectopic pregnancy, but is a valid alternative in selected patients Expectant management remains unvalidated (E&amp;G)</td>
</tr>
<tr>
<td>Laparoscopic surgery for pelvic pain associated with endometriosis (Jacobson et al., 2001)</td>
<td>1</td>
<td>63</td>
<td>October 2001</td>
<td>Laparoscopic laser removal of minimal, mild and moderate endometriosis significantly improves pelvic pain at 6 months (E)</td>
</tr>
<tr>
<td>Excisional surgery versus ablative surgery for ovarian endometriomata (Hart et al., 2005)</td>
<td>2</td>
<td>164</td>
<td>July 2005</td>
<td>Excisional surgery is superior for avoiding recurrence of pelvic pain and endometriomata, and improving fertility (E)</td>
</tr>
<tr>
<td>Barrier agents for preventing adhesions after surgery for subfertility (Farquhar et al., 2000)</td>
<td>15</td>
<td>959</td>
<td>April 1999</td>
<td>Although there is a significant reduction in pelvic adhesion formation, there is no evidence of a significant difference in odds of pregnancy for Interceed versus no treatment at laparoscopy (both reformation and de-novo) Interceed versus no treatment at laparotomy Gore-Tex versus no treatment Separafilm versus no treatment for myomectomy Gore-Tex versus Interceed (G)</td>
</tr>
<tr>
<td>Fluid and pharmacological agents for adhesion prevention after gynaecological surgery (Metwally et al., 2006)</td>
<td>18</td>
<td>1814</td>
<td>April 2006</td>
<td>Insufficient evidence of benefit of steroids, dextran, other pharmacological agents, icodextrin 4% or SprayGel Hyaluronic acid agents may decrease adhesion formation and prevent deterioration of pre-existing adhesions (G)</td>
</tr>
<tr>
<td>Surgical interruption of pelvic nerve pathways for primary and secondary dysmenorrhoea (Proctor et al., 2005)</td>
<td>9</td>
<td>755</td>
<td>October 2005</td>
<td>Laparoscopic uterine nerve ablation (LUNA) is effective for primary dysmenorrhoea No evidence of a significant additional effect of LUNA in laparoscopic removal of endometriosis Limited evidence that presacral neurectomy significantly improves relief of midline dysmenorrhoea when added to surgical removal of endometriosis (E&amp;G)</td>
</tr>
</tbody>
</table>
RCTs of surgical approach to hysterectomy (Johnson et al., example, no long-term outcomes were reported in 23 comes, which are rarely reported in surgical RCTs. For fields. A third key is the pursuit of important long-term out-
owing to the rapid progress that is typical of most surgical 

Significant additional effect of LUNA in laparoscopic removal of endometriosis

Fluid and pharmacological agents for adhesion prevention after gynaecological surgery

Significant difference in the odds of pregnancy for barrier agents for preventing adhesions after surgery for subfertility

Expectant management for the treatment of tubal ectopic pregnancy

Thermocoagulation versus electrocoagulation in adhesiolysis

Different techniques of salpingostomy for pelvic surgery in subfertility

Open versus laparoscopic salpingosomatolysis for tubal patency

Different techniques of salpingostomy for pelvic surgery in subfertility

Thermocoagulation versus electrocoagulation in adhesiolysis

Postoperative hydrodilation for postoperative procedures for improving fertility following pelvic reproductive surgery

Second look laparoscopy with adhesiolysis for postoperative procedures for improving fertility following pelvic reproductive surgery

Laparoscopic versus abdominal hysterectomy for surgery time and uterine tract injury

Laparoscopic versus open surgery for elimination of trophoblastic tissue for tubal ectopic pregnancy

Laparoscopic salpingostomy versus laparoscopic salpingostomy and single methotrexate injection for tubal ectopic pregnancy

Local methotrexate injection versus laparoscopic conservative surgery in elimination of ectopic pregnancy

Interventions likely to be beneficial

Open retropubic colposuspension versus conservative treatment, anticolinergic treatment, anterior colporrhaphy and needle suspension

Burch colposuspension versus Marshall–Marchetti–Krantz

Suburethral slings versus anticholinergics

Abdominal sacral colpopexy versus vaginal sacropinous fixation

Vaginal versus transanal repair for posterior vaginal wall prolapse

Tension free vaginal tape reduces postoperative stress incontinence in anterior colporrhaphy procedures

Suction versus prostaglandin in first trimester termination of pregnancy for completion and pain reduction

Hysterectomy versus endometrial resection for heavy menstrual bleeding

Hysterectomy versus medical treatments for heavy menstrual bleeding to reduce menstrual loss at 1 year

Laparoscopic surgery for subfertility associated with endometriosis to improve odds of live birth and ongoing pregnancy

Laparoscopic salpingectomy for hydrosalpinges prior to IVF to improve odds of live birth and ongoing pregnancy

Vaginal and laparoscopic versus abdominal hysterectomy for speedier return to normal activities

Subtotal versus total hysterectomy for benign gynaecological diseases

Laparoscopy versus laparotomy for benign ovarian tumours

Laparoscopic versus open surgery for reduction in recovery time and lower costs for tubal ectopic pregnancy

Laparoscopic laser removal of minimal, mild and moderate endometriosis for pelvic pain

Excisional surgery for avoiding recurrence of pelvic pain and improving fertility associated with ovarian endometriomata

Laparoscopic uterine nerve ablation for primary dysmenorrhoea

Presacral neurectomy for midline dysmenorrhoea when added to surgical removal of endometriosis

Interventions likely to be harmful or ineffective

Anterior vaginal repair versus open retropubic suspension

Bladder neck needle suspension versus open abdominal retropubic suspension or suburethral slings

Suburethral slings versus open retropubic suspensions and needle suspensions.

Laparoscopic colposuspension versus open colposuspension and self-fixing sling devices

Vacuum versus dilation and curettage and flexible versus rigid vacuum aspiration cannulae for first trimester termination

Ring versus clip, Pomeroy versus electrocoagulation, ring versus electrocoagulation, Pomeroy versus Filschier clip and Hula versus Filschier clip for female sterilization

Culdoscopy versus minilaparotomy and laparoscopic approach to tubal sterilization

Minilaparotomy versus laparoscopic tubal sterilization

Different endometrial destruction techniques for heavy menstrual bleeding

Hystereomy versus endometrial resection for heavy menstrual bleeding (adverse events)

Surgery versus levonorgestrel intrauterine system for quality of life difference for treatment of heavy menstrual bleeding

Carbon dioxide laser versus standard techniques in adhesiolysis and salpingostomy

Open versus laparoscopic salpingosomatolysis for tubal patency

Different techniques of salpingostomy for pelvic surgery in subfertility

Interventions of unknown benefit

Anterior vaginal repair versus physical therapy, suburethral sling operations, laparoscopic colposuspension and alternative vaginal operations

Bladder neck needle suspension versus conservative management, perurethral injections, sham surgery and laparoscopic surgery

Open retropubic colposuspension versus suburethral sling and laparoscopic colposuspension

Suburethral slings versus laparoscopic retropubic suspension, anterior repair, per-urethral injections and artificial sphincters

Prolapse surgery on continence issues

Infertility surgery versus no treatment or alternative treatment

Use of magnification in tubal surgery

Any particular technique for surgical retrieval of sperm

Long-term outcomes of different surgical approach to hysterectomy for benign gynaecological disease

Expectant management for the treatment of tubal ectopic pregnancy

Significant difference in the odds of pregnancy for barrier agents for preventing adhesions after surgery for subfertility

Fluid and pharmacological agents for adhesion prevention after gynaecological surgery

Significant additional effect of LUNA in laparoscopic removal of endometriosis
need to organize well-powered multi-centre trials of surgical interventions—in doing so, we will move completely away from a non-scientific to a scientific basis for surgery.

**Author’s Contribution**

I, N.P.J., contributed to the conception of the review, performed the literature search, took part in the analysis and completion of the first draft and subsequent amendments. I have approved the final version and am guarantor.

I, T.S., contributed to the concept of the review, took part in the literature search, contributed first draft and amendments. I have approved the final version.

I, J.Z., contributed to the conception of the review, took part in the analysis and contributed to the first draft and amendments. I have approved the final version.

I, K.S.K., contributed to the conception of the review, took part in the analysis and contributed to the first draft and amendments. I have approved the final version.

**References**


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