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PERSPECTIVE

The future of gynaecological endoscopy: from the work presented in the Free Communications during the ESGE Meeting in Florence October 2009

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The senior author has had the privilege, along with almost 2,000 other delegates, of visiting the extraordinary ESGE meeting in Florence recently. The size of the turnout suggests that there is much going well in the field of gynaecological surgery. Minimal access techniques are now being used in every inhabited continent and in every type of health care system. There are more and more doctors of every nationality, colour and religion coming together with the single aim of improving the outcomes of surgical interventions in women. Reviewing the more than 400 talks, videos and posters presented at the ESGE meeting clearly demonstrates how minimal access techniques may be used for virtual every surgical intervention in gynaecology.

We were also privileged to see enormous trade exhibitions with literally hundreds of new refined tools and devices, all designed to make surgically easier, more acceptable and above all safer for our patients. Whilst self-evidently good, this excess of technological virtuosity brings with it major concerns. The very number and variety of these advanced technologies can, in fact, be rather overwhelming. Many of these devices are extraordinarily expensive and in these difficult financial times it is ethically essential that, irrespective of the type of health care system in which we practice, we develop systems that not only work but work cost-effectively. With this concept in mind, we present here our personal review of some of the presentations from this important meeting.

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1. *Improved imaging techniques*. From the first video laparoscopies, there has been a steady and dramatic improvement in the quality of the images we have. Better light sources and cameras have replaced dull, poorly illuminated pictures by images of consistent high quality. Three-chip cameras are now standard and increasingly high-definition systems are becoming available. The results of these technological advances were demonstrated by the extraordinary quality of many of the videos shown throughout the meeting. This is an area which is perhaps difficult to justify on formal cost effect analysis but in which there can be no compromise. To undertake surgery with inadequate vision is both impractical and unethical. Conversely, the better the image available, the better the definition of the anatomy and pathology and so the more precise and better the quality of the surgery should be. The images are now so good it is difficult to anticipate further meaningful improvements but it is probable that further miniaturisation will make the instruments easier to use, particularly in areas currently difficult to access. Three-dimensional imaging would also simplify dissection and suturing. Such systems have been tried previously but have been found to be heavy and difficult to use and to also produce unstable and nausea-producing images. It is likely that improvements in these systems may soon result in the wide availability of useful 3-D imaging systems.
2. *Entry techniques*. From the earliest days of laparoscopic surgery the safest and best method of entry into the abdominal cavity has been a matter of controversy. The data has been recently reviewed and extensively commented on in this journal (Sutton). Because of the relative infrequency of serious entry-related injury it has not been possible to do large enough trials to prove

the superiority of any particular entry method. This enables different groups to continue to advocate different methods with the continued claims that each is "safe". The highly respected and experienced Strasbourg group advocates the use of direct entry techniques (V1_04 S52) and a UK group performed a small-number retrospective study to compare this approach to 'conventional' Veress Needle entry (FC1_18). Meanwhile, a Florence group describes a 15-year experience with the open technique (FC1_21 S78). A different and very carefully thought-out approach to the physical problems associated with abdominal wall entry has been studied by Ternamin. Two new methods of abdominal entry are now being heavily promoted by industry on the back of rather limited preliminary clinical data. Single port entry systems with a wide range of ingenious tools are being developed (FC1-12S75) on the concept that one larger incision in the umbilicus must be better than three to four smaller incisions scattered across the abdomen. Is an incision that must inevitably spread outside the confines of the umbilicus onto the anterior abdominal wall be cosmetically preferable to an entry incision deep in the umbilicus associated with secondary sites low in the abdomen? The authors would like to be satisfied that this basic premise is correct before vast sums are spent on developing instruments for a concept that may be fundamentally flawed, at least for most gynaecological indications. Another new method of abdominal cavity entry that is attracting considerable interest is natural orifice transluminal endoscopic surgery. The vagina is clearly a natural orifice and therefore may be a useful portal for entry into the abdominal cavity. It has attracted interest principally from the general surgeons (FC1_08) and gynaecological oncologists (FC1_15 S76) so far. The evidence is very preliminary at this time and we must wait until adequate indications before this approach should be widely taken up by gynaecologists.

3. *Robotic surgery*. The ultimate technological tour de force seen at this meeting was the robotic assisted surgery equipment. At first sight, these devices with their considerable bulk, fiddly fittings and enormous expense seem unlikely to have a realistic role in the immediate future of gynaecological surgery. However, they offer wonderful, true three-dimensional imaging and amazing 5 degrees of freedom instrumentation. The combination of better imaging and easier and more precise surgical approaches with more expensive equipment is a package sounding very familiar to those of us who in the 1980s and 1990s spent much energy extolling the virtues of laparoscopic surgery over conventional laparotomy. The concept that better visualisation of the anatomy and pathology will lead to better surgical outcomes remains as central to our work now as it did 20–30 years ago. Any equipment that offers the prospect of conducting more precise removal of pathology and simpler more accurate haemostasis and repair must be subject to careful evaluation whatever the start up costs. In an interesting randomised controlled trial (RCT), robotic hysterectomy took longer to perform when compared to conventional laparoscopic hysterectomy for benign indications (FC5_05) but with similar post-operative outcomes. There seemed to be more early evidence to support the use of this novel equipment in gynaecological cancer surgery (FC6_06 and FC6_22). In the latter study of robotic versus laparoscopic radical hysterectomy, interestingly the operative time was less with the robotic approach (257 min) compared to the conventional laparoscopic radical hysterectomy (329 min). Other surgical and oncological markers seemed similar. Robotic assisted tubal reanastomosis also appears to be associated with satisfactory clinical outcomes with an overall pregnancy rate of 71% and birth rate of 62% (FC4_05)
4. *Adhesion prevention*. Adhesions are currently seen to be an almost inevitable consequence of intra-abdominal surgery and may be responsible for much post-surgical morbidity. They are also thought to be of major economic significance and a successful method of preventing adhesion formation is a surgical dream. Many therapies have been tried and most have so far been found wanting. More encouraging results are being reported using polyethylene glycol (Sprayshield). In two small RCTs, a reduction of up to 50% in adhesion formation after laparoscopic surgery was reported (FC1_13, FC1_22). In a larger, well-constructed and important RCT investigating the effectiveness of PREVADU adhesion barrier, the data demonstrated a highly significant reduction in the presence of adhesions 10–20 weeks after laparoscopic myomectomy 43% vs 92% and in de novo adhesion formation (27% vs 93%) using this material.
5. *Endometriosis*. A large number of papers in the meeting were concerned with aspects of the diagnosis, effects and management of endometriosis. Considerable efforts are being made to determine the extent and distribution of endometriosis prior to undertaking surgery (FC2_05), including the use of ultrasound (FC2_07), MRI (FC2_12) and immunological markers (FC2_13). Similarly, there is continuing interest in trying to accurately measure the outcomes after various types of surgery for endometriosis (FC2_02, FC2_09 and FC2_11). Areas of controversy remain about the best surgical approaches in various situations. Despite a recent Cochrane review on the subject, it remains a

matter of controversy whether ablation or excision of the capsule of ovarian endometriomata is the better method to prevent recurrence while minimising damage to ovarian function and reproductive potential. In an interesting retrospective study, one group (FC2_10) concluded that coagulation resulted in less recurrences and better symptomatic relief. As this contradicts the rather inadequate Cochrane review, this matter needs further definitive studies to resolve. Similarly, perhaps the most pressing issue to resolve in endometriosis surgery is to determine the best way to manage colorectal endometriosis. In a comparative study, one group found that patients undergoing segmental resection suffered more severe and frequent serious long-term morbidity than patients undergoing only excision of the nodule (FC2_03). An extensive literature review also suggested a high morbidity rate with rectal resection (FC2_20). As an increasing number of anterior resections are being performed on women with deep infiltrating endometriosis, it is important that the long-term risks and benefits of this approach are clearly established.

6. *Hysterectomy*. From Japan (FC5_03) through Russia (FC5_06) and Northern Ireland (FC5_02) to Columbia (FC5_06), total laparoscopic hysterectomy (LH) is being established as a part of the gynaecological surgeon's validated approaches in the elderly as well as younger patients (FC5_04). Its superiority over the abdominal approach is now well established. The advantages of the laparoscopic approach over the vaginal approach, however, have not been demonstrated, and in many circumstances vaginal hysterectomy is quicker and cheaper than LH with similar post-operative QoL measures (FC5_09).
7. *Gynaecological oncology*. Laparoscopic approach allows the identification and safe removal of pelvic lymph nodes (FC6_02, FC6_16) and many sentinel nodes (FC6_07). Endometrial cancer may be safely treated by laparoscopic techniques with no greater risk of recurrence than after standard open surgery (FC6_13). This approach has also been used in patients with early stage endometrial cancer, for women who wish to preserve their fertility (FC6_14,) and in still rare number of cases has been used in the management of locally advanced cervical cancer (FC6_21) and early ovarian cancer (FC6_23). The current evidence is predominantly for early, clinical stage 1 endometrial cancer and long-term data are still needed. The role of laparoscopic surgery in the management of various gynaecological cancers must be more fully investigated for long-term safety and efficacy, but current results suggest this may become one of the most important applications of this minimal access surgical approach.
8. *Myomata*. There are an ever increasing number of surgical options available for the treatment of uterine fibroids. Obviously, the location and size combined with the age and reproductive intentions of the patient will profoundly influence the method chosen. For those in whom fertility is complete, hysterectomy remains an attractive option and the safety of total laparoscopic hysterectomy for such indications is being increasingly demonstrated (FC5_10). In those wishing to preserve their fertility, laparoscopic myomectomy has been shown to be effective (FC1_26). Uterine artery embolisation (UAE) is increasingly being considered as an alternative to hysterectomy and myomectomy. In a large RCT comparing these two approaches (EMMY Trial FC1_14), some 25% of the UAE had a hysterectomy because of inadequate symptom relief. Of the remaining patients, 75% had heavy menstrual losses controlled by the UAE. These data may be interpreted on the basis of is your glass half full or half empty? UAE provides symptom control in a proportion of patients, thus avoiding hysterectomy but compared with hysterectomy in which the procedure is 100% effective, these results are less impressive. However, for those keen to avoid hysterectomy, this approach may be appropriate. The uterine arteries may be occluded laparoscopically rather than by microsphere obstruction. A comparative study compared these two approaches and followed up both groups with hysteroscopy 6 months after surgery (FC1_11). Normal cavity morphology was found more frequently after laparoscopic uterine artery occlusion (LUAO; 97%) than UAE (40%), and functional endometrium was also more frequently found in the LUAO group (95% vs 86%) suggesting that LUAO may be the preferred method of occluding the uterine arteries. More studies to compare this laparoscopic approach against hysterectomy and UAE are required. Another new modality of possible benefit in the treatment of fibroids is ultrasound-guided high-intensity focussed ultrasound. Preliminary data on this novel approach is now available (FC1_34) and merits further study. Interstitial laser photocoagulation has also been used in the treatment of fibroids (FC1_37). Fibroids with a significant intra-cavity component can of course also be treated hysteroscopically (FC3_09) and long-term results are becoming available to demonstrate the clinical effectiveness of this approach in which 86% of women reported resolution of menorrhagia some 4 1/2 years after treatment (FC3_44). A Russian group reminds us, however, that fibroids may also be removed by the vaginal route (FC1_21).
9. *Hysteroscopic endometrial ablation*. Second generation hysteroscopic endometrial ablation systems are

now a well-established method of treating dysfunctional uterine haemorrhage. Balloon systems produce relief of menorrhagia and dysmenorrhoea in around 60–65% of patients (FC3_34). In a large RCT, the new Gynecare Thermachoice III was compared to an earlier uterine balloon system. The new system was more effective in producing amenorrhoea (26.8% vs 13%) for the first generation device (FC3_40). In a comparative retrospective study of Novasure bipolar diathermy system against microwave endometrial ablation (MEA), 87% of the Novasure and 73% of the MEA groups reported improvement in the menstrual loss 6 months after treatment with higher amenorrhoea and patient satisfaction rates in the Novasure group (FC3_15). The potential benefits of trans-uterine methods of sterilisation have long fascinated hysteroscopists, and there have been many attempts to develop a satisfactory and secure system. The Essure system is attracting considerable interest (FC3_11, FC3_20, FC3_43) and appears to provide a fairly reliable method of contraception. When compared with standard Filshie laparoscopic sterilisation, the Essure system appeared to be more cost-effective and associated with fewer menstrual side effects (FC3_12). The use of this sterilisation technique combined with hydrothermal ablation has also been shown to be possible (FC3_08, FC3_28), but the indications for such combined procedures have not yet been defined.

This brief review of the many papers presented at the 18th Annual Congress of the ESGE very clearly demonstrate how from its faltering first steps the concept of minimal access has permeated into every area of gynaecological surgical practice. The gynaecological surgeons of today cannot offer their patients state-of-the art surgical interventions without proficiency in this central concept and at least some of its many applications. The ESGE has become one of the pre-eminent bodies in the world, making these techniques more readily available to more gynaecologists and their patients. These papers show how far we have come, but also more clearly illuminate the distance we must still travel. There are still many unanswered questions. Each and every new approach must be carefully evaluated and assessed for effectiveness and safety. There is much still to do, but the future looks bright even in these difficult social and financial times.

References

All papers highlighted in this review are summarised in Gynaecological Surgery Vol 6. Supplement 1; October 2009 and are indicated by their presentation code e.g. FC1_18