Another Wave at an old Chestnut

Endometriosis treatment laparascpically by the Helica T.C.

Summary,
The Helium beam coagulator is an important treatment modalitiy in the this controversial disease which may cause improvement in ways not previously described. It is cheaper than laser, with lower power levels than other fulgaration techniques, allowing treatment of large surface areas and is intrinsically safer than traditional methods even on vital structures.

ANOTHER WAVE AT AN OLD CHESTNUT

THE HELIUM BEAM COAGULATOR IN THE TREATMENT OF ENDOMETRIOSIS

SUMMARY
Helium beam coagulation of peritoneal endometriosis is a new technique which is cheap and allows extensive areas of peritoneum to be treated safely.

INTRODUCTION
The “old chestnut” referred to in the title refers to endometriosis which remains an enigma. Debate still continues as to what constitutes disease and then whether to treat or not. Recent studies suggest a prevalence of endometriosis in up to 80% of women complaining of infertility and pelvic pain. Other studies suggest that endometriosis may occur in up to 22% of fertile asymptomatic women undergoing sterilisation!

Moreover the natural history of ectopic endometrium still remains unresolved, as does the relationship between ectopic endometrium, infertility and pelvic pain. In addition the most appropriate treatment modality is questionable with placebo alone curing or improving up to 33% of cases. Not surprisingly therefore, the current classification of endometriosis based on the revised American Fertility Society criteria is under scrutiny. Stage 1 disease may include lesions which represent active, variably active or inactive disease - all with different disease potential. Recommendations therefore have been made to define three types of lesion involving the peritoneum based on colour. Active endometrial tissue is usually found in the red lesions, irregularly active tissue in the black lesions and scanty inactive tissue in the white lesions.

Endometriosis most commonly affects the pelvic peritoneum close to the ovaries, including the uterosacral ligaments, the ovarian fossa peritoneum and the peritoneum of the Pouch of Douglas.
A wide variety of surgical procedures may be used in the treatment of endometriosis all of which can be performed by laparoscopy. Endometriotic lesions may be treated by electrosurgical techniques, laser, ultrasound generated vibrational energy or by excision.

Electrosurgery can be used to cut or coagulate. Coagulation can be achieved either by dessication or fulguration. Fulguration involves a non touch technique and allows treatment of a large surface area. Both traditional diathermy and the argon beam require high wattage in order to achieve fulguration. With this level of power accidental damage of vital structures is possible.

“Another wave” in the title refers to the fact that by modifying AC current is now possible to achieve fulguration at very much reduced power levels. This innovation is achieved with the helium beam coagulator (Helica thermal coagulator, Helica Instruments, Research & Development Park, Heriot Watt University, Edinburgh) which allows fulguration to occur at power levels of 8 watts. If tissue contact occurs, there is less energy transferred to underlying tissues and therefore less potential for damage. This technique is therefore intrinsically safer than previous methods of fulguration. This form of treatment has been offered in the unit since May 1994.

METHOD
Twenty patients were followed up who presented with pain or dyspareunia and had endometriosis diagnosed at initial laparoscopy. These patients were reviewed with regard to symptom relief.
A patient who was undergoing a total abdominal hysterectomy for menorrhagia agreed to have her uterus and broad ligament fulgurated with the Helica thermal coagulator (HTC) both in vivo and in vitro. The uterus was fulgurated for 2 seconds, 5 seconds and 10 seconds at distances

of 2mm, 5mm and 8mm (strike). The lateral spread was measured macroscopically at the time of surgery, whereas the depth of spread was measured by the pathologists. In addition fulguration was performed laparoscopically in situ over the peritoneum of the ovarian fossa in another women with stage 1 endometriosis. This was then dissected out and sent to pathology for measurement.

RESULTS

Twenty women, median age 30 years (range 21 - 42 years) have so far undergone treatment with the HTC for symptomatic disease (median stage 1; range 1 - 4). Fourteen patients had already experienced failed medical treatment and the interval between initial diagnosis and HTC treatment was up to 7 years. Twelve patients reported improvement or cure of their symptoms at 3 months. In 3, treatment had only recently been performed and was therefore too early to assess. One patient was lost to follow up and 1 patient with peritoneal endometriosis also involving the liver admitted no improvement (although gallstones have subsequently been diagnosed).

In Vivo depth penetration

	2mm	5mm	8mm (strike)
2secs	0.7mm	0.5mm	0.4mm
5secs	1.0mm	0.9mm	0.5mm
10secs	1.1mm	1.0mm	0.8mm

In Vivo lateral spread

	2mm	5mm	8mm(strike)
2secs	6.0mm	5.0mm	5.0mm
5secs	6.0mm	6.0mm	6.5mm
10secs	9.0mm	7.5mm	7.0mm

In Vitro depth penetration

	2mm	5mm	8mm(strike)
2secs	0.5mm	0.5mm	0.5mm
5secs	0.7mm	0.8mm	0.7mm
10secs	1.0mm	0.7mm	0.5mm

In Vitro lateral spread

	2mm	5mm	8mm(strike)
2secs	4.0mm	3.0mm	4.0mm
5secs	7.0mm	6.5mm	6.0mm
10secs	9.0mm	8.0mm	7.0mm

The peritoneum over the broad ligament fulgurated to a depth of 0.5 - 1mm and the peritoneum dissected after laparoscopic fulguration showed that tissue had been destroyed to a depth of 1 - 1.5mm.

DISCUSSION

The frequency with which endometriosis is being diagnosed is increasing. This is due to “non classical powder burn lesions” being recognised as part of the same disease process. Furthermore there is increasing awareness that macroscopically normal peritoneum may contain ectopic endometrium when examined under the microscope.

In many women endometriosis represents a progressive disease which is held in remission by medical therapy or conservative surgery. In clinical practice endometriosis is diagnosed at the time of laparoscopy performed for the evaluation of pelvic pain or infertility. For women with stage 1 or stage 2 disease with somatic complaints, surgical treatment at the time of diagnosis can provide prompt relief of symptoms without the possible side effects of medical treatment.

The helium beam coagulator is a new technique which allows extensive treatment to be carried out on all lesion types of the peritoneum and also is safe in the fulguration of normal looking endometrium between macroscopic disease.

The short term patient improvement rate (60%) is promising, and is better than reported placebo rates. As expected lateral spread and depth penetration appears to be a function of time and distance. Interestingly the depth of penetration on the uterus is to a maximum of 1.1mm. This contrasts with the peritoneum where a maximal depth of penetration of 1.5mm (range 0.5mm - 1.5mm) occurs. This increase in depth may be due to a poorer blood supply to the peritoneum, a difference in tissue consistency or sampling variation.

The question must be addressed as to how the HTC achieves a cure in endometriosis where glands are more than 1.5mm below the surface. The answer may be that coagulation of the abnormal vascularisation occurs thereby causing ischaemia and ultimately necrosis of the ectopic endometrium rather than by ablation of the deposits per se.

CONCLUSION

The helium beam coagulator is an important new treatment modality in this controversial disease which may cause improvement in a way not previously described. It is cheaper than laser, uses lower power levels than other fulguration techniques and allows a large surface area to be treated. As it requires less power it is intrinsically safer than traditional fulguration and can be used over deposits on vital structures.