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HISTOLOGICAL QUANTIFICATION OF THE TISSUE DAMAGE CAUSED IN VIVO BY NEUTRAL PLASMAJET™ COAGULATOR.

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Introduction and Objective: The PlasmaJet™ coagulator is a new technology using neutral pure argon plasma to achieve coagulation. A high energy jet beam of argon gives up its kinetic energy as heat and achieves coagulation by forming a multilayer eschar.

The objective of this study was to evaluate the tissue damage caused by plasmajet coagulator in the uterus, ovary, and fallopian tube at different power settings in vitro and then to examine the damage caused in vivo. Our hypothesis was that it is a safe technology to use and that it compares to the currently used techniques of coagulation.

Methods: 5 subjects undergoing hysterectomy with unilateral or bilateral salpingo-oophorectomy were prospectively recruited for in vitro assessment. Tissue damage was evaluated histologically accounting for power levels at 10%, 15%, and 20%; for duration of application of diathermy at 2 and 5 seconds; and for distance between the tip of probe and tissue at 0.5 and 1cm. 15 subjects undergoing hysterectomy with unilateral or bilateral salpingo-oophorectomy were prospectively recruited for in vivo assessment of plasmajet coagulator. The most suitable power setting, duration of diathermy, and distance from tissue was decided from in vitro examination and applied on in vivo setting and compared to helica thermal coagulator set at a standard low power setting used for treating endometriosis. Tissue damage was evaluated histologically.

Results: Data was normally distributed. ANOVA was used to compare the mean differences. There was no significant difference seen in the depth and width of tissue damage in the in vitro specimens at different power levels, distance, and duration of diathermy ($P>0.05$). A setting of 20% power, duration of 5 secs of diathermy, and a clinically acceptable distance of 0.5 to 1cm was used therefore for in vivo setting. This was compared to Helica coagulator which was set at the widely used low power setting. In all the types of tissue (uterus, ovary and fallopian tube), controlling for time, distance and power, there was significantly lesser tissue damage in width (lateral spread) seen with plasmajet than Helica coagulator ($P<0.05$). There was no significant difference in the depth of tissue damage between the two coagulators ($P>0.05$).

Conclusion: Plasmajet coagulator is a safe method of coagulation at 20% power on gynaecological tissues. The lateral spread (width of tissue damage) is lesser with plasmajet than as compared to Helica.