Harmonic Scalpel

The Harmonic Scalpel is an instrument that uses ultrasound technology to cut tissues while simultaneously sealing them. It utilizes a hand-held ultrasound transducer and scalpel which is controlled by a hand switch or foot pedal. The ultrasonic generator converts ultrasonic energy into mechanical energy. It has three compatible probes both for open and laparoscopic surgery that are shear, blade and hook. The shear can coagulate vessel up to 5mm whereas blade and hook can coagulate up to 2mm of vessel. During use, the scalpel vibrates at 55.5 kHz or 55,500 vibrations/sec and cuts through tissues, effecting hemostasis by sealing vessels and tissues by means of protein denaturation caused by vibration rather than heat. It provides cutting precision, even through thickened scar tissue, and visibility is enhanced due to less smoke being created by this system during use compared to routine electro surgery. It is claimed that patients experience less swelling, bleeding and bruising after the use of the harmonic scalpel than when a conventional scalpel is used, and blood vessels are sealed with a much lower temperature than conventional diathermy and so there is less thermal damage to adjacent tissue, with less charring and desiccation. It is manufactured and marketed by “ETHICON” across the globe.

Ultrasonic harmonic scalpel has been effectively used for a variety of surgical procedures mainly intra-abdominal (like Nissen fundoplication and cholecystectomies) intra thoracic and gynecological. Moreover, it is an instrument that has been widely used in all surgical specialties with encouraging results. In Head and Neck surgery it is used in tonsillectomy, benign and malignant diseases of thyroid and parotid glands (mainly thyroidectomy and superficial parotidectomy), radical neck dissections and for myocutaneous flaps. In Cardiovascular and Thoracic surgery it is used for Lung and Thymic resections, Laparoscopic thoracic Esophagectomy, Pericardial resections and harvesting of internal mammary and radial arteries of CABG. In Abdomino-Pelvic surgery it is used in Cholecystectomy (esp. in liver cirrhosis), laparoscopic liver resections, Pancreatic resections including laparoscopic cystogastrostomy, Antireflux surgery including highly selective vagotomy, colorectal surgery including hemorrhoidectomy, laparoscopic appendectomy, splenectomy, nephrectomy and adrenalectomy. In Gynecological procedures it is used in Hysterectomy, laparoscopic myomectomy, cervical and endometrial biopsies and laparoscopic ligation of fallopian tubes for sterilization. It is also used in Plastic and Reconstructive surgery like Modified Radical Mastectomy, Breast reduction surgery, Pectoralis Major Myocutaneous flap dissection and in Latissimus Dorsi muscle mobilization.

In Pakistan different studies are published on usage of Harmonic Scalpel in different surgical procedures. Although its major use in cholecystectomy, thyroidectomy and tonsillectomy but different centers have shown its role in Hemorrhoidectomy, Modified Radical Mastectomy, Liver and Lung resections, Laparoscopic Appendectomy and Hysterectomy with promising results in terms of postoperative outcomes in comparison to conventional surgical hemostatic techniques.

References