Less smoke and minimal tissue carbonization using a thulium laser for laparoscopic partial nephrectomy without hilar clamping in a porcine model.

Bui MH, Breda A, Gui D, Said J, Schulam P.
mattbui@gmail.com

PURPOSE: We evaluated the utility of a thulium laser and a novel implementation of its use for laparoscopic partial nephrectomy to achieve precise, smokeless, and hemostatic dissection without hilar clamping and with minimal charring in a porcine model. MATERIALS AND METHODS: Laparoscopic transperitoneal lower-pole partial nephrectomy was performed in five Yorkshire farm pigs without clamping of the renal hilum. All animals were kept alive for 1 week. Using a 365-mum laser fiber, a 30 W thulium laser was used to produce full-thickness cortical excisions of the lower-pole renal cortex. The laser fiber was delivered through the working channel of a 16F flexible cystoscope inserted through a 10-mm laparoscopic port. The laser incision was directed by manual deflection of the cystoscope along with low-pressure saline irrigation through the cystoscope. RESULTS: Laparoscopic partial nephrectomy was completed in all cases without perioperative complications and with an estimated blood loss of <50 mL. The thulium laser was able to cut tissue and simultaneously to coagulate vessels as large as 1.6 mm. The flexible cystoscope with concurrent saline irrigation permitted precise laser control for dissection with minimal tissue charring and no smoke to obscure visibility. At 1 week, the cut edge of the tissue showed minimal necrosis with preservation of histologic architecture. CONCLUSIONS: Laparoscopic partial nephrectomy with the thulium laser provides precise dissection and hemostasis without hilar clamping. Minimal tissue charring and no smoke generation improve visibility.