Efficacy of ultrasonic tissue dissector and tissue glue for laparoscopic partial nephrectomy in a porcine model

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摘要

Abstract

The purpose of this study was to evaluate the efficacy and long-term tissue effects of ultrasonic dissector and cyanoacrylate glue during laparoscopic partial nephrectomy in a porcine model. Nine domestic pigs underwent laparoscopic left lower pole partial nephrectomy without vascular control. An ultrasonic tissue dissector was used to assist in the parenchymal incision, and the raw surfaces of the kidneys, including the exposed urinary system, were sealed with cyanoacrylate glue. No internal stents or additional sutures were placed. Intraoperative hemorrhages and urinary extravasation were recorded. The animals were humanely killed 28 days after undergoing the operations. The long-term effects of ultrasonic dissector and cyanoacrylate glueon the healing process of urothelium and renal parenchyma were determined histologically. All pigs survived the laparoscopic partial nephrectomy, and the blood loss ranged from 0 to 120 ml (mean, 60 ml). The average operative time was 89 +/- 10 min.The severity of the bleeding was minimal in six animals and moderate in three animals. No urinary extravasation was found using intravenous urography at the 28th postoperative day. No urinary fistula or renal abscess formation was found histologically. Cyanoacrylate glue infiltrated into the tissue defects and did not dissolve. The glue was encased by fibrotic tissue with minimal foreign body inflammatory reaction. Ultrasonic dissector was effective in achieving hemostasis during laparoscopic partial nephrectomy without the need of vascular control in pigs. Cyanoacrylate glue achieved good long-term adhesive power. The sealing effects provided by cyanoacrylate glue were adequate to prevent urinary extravasation from urothelial defects at least for 1 month.