Suture or hemostatic agent during laparoscopic partial nephrectomy? A randomized study using a hypertensive porcine model.

Authors: Rouach Y, Delongchamps NB, Patey N, Fontaine E, Timsit MO, Thiounn N, Mejean A

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Abstract:

OBJECTIVES: To compare the efficacy of 3 biologic hemostatic devices with that of conventional suture during laparoscopic partial nephrectomy (LPN) in a hypertensive porcine model. Improving hemostasis, urinary tract closure, and the warm ischemia (WI) time are important in the development of LPN.

METHODS: A total of 40 pigs were randomized prospectively into 4 groups before bilateral LPN. Right LPN involved 30% of the renal parenchyma without a urinary tract opening, and left LPN involved 40% of the renal parenchyma with a urinary tract opening. The renal section was treated with fibrin/thrombin sealant, fibrin glue, thrombin/gelatin granules, and conventional suture in groups 1, 2, 3, and 4, respectively. At 10 days postoperatively, left retrograde pyelography was performed. The pigs were then killed and the kidneys sent for pathologic analysis. The main criteria were the estimated blood loss, perioperative WI time, leaking pressure during retrograde pyelography, and parenchyma necrotic-induced lesions.

RESULTS: The estimated blood loss was lower in the pigs treated with either thrombin/gelatin granules or suture ($P < .001$). The use of thrombin/gelatin granules decreased the WI time compared with the use of suture ($P < .001$). However, the leaking pressure was greater in the pigs treated with suture ($P < .01$). The mean area of necrosis around the renal section was shorter when no suturing was performed ($P < .01$).

CONCLUSIONS: The use of thrombin/gelatin granules alone controlled hemostasis as effectively as suture and significantly decreased the WI time. However, conventional suture of the urinary tract, when opened, should be considered. Additional evaluation in humans is required before any clinical recommendation can be made.