Conclusions: We developed a reliable technique of angiographic delivery of gel polymer for temporary vascular occlusion of selective renal artery branches using local plug formation. Ongoing studies are under way to assess technique consistency and the long-term effects of the polymer.

Editorial Comment

This is an interesting experimental study in pigs, on which the authors tested the intra-arterial injection of reverse thermoplastic polymer LeGoo-XL that allows temporary selective vascular occlusion. The polymer was used with the intend of facilitate hemostasis for laparoscopic partial nephrectomy of the lower (caudal) pole. The perfusion hemostasis was not reliable in achieving occlusion while when using a local plug formation for hemostasis the results were consistent, with occlusion time from 13 to 30 minutes. The authors performed 2 robotic partial nephrectomies and concluded that the technique allowed minimal blood loss. Nevertheless, the authors did not take into account previous studies on intra-renal anatomy in pigs. While the collecting system anatomy is very similar to that of humans (1), the arterial (2) and venous (3) intra-renal anatomy in pigs is different from that of humans in many aspects that would be interesting to be discussed. Also, there are many important differences in the upper and lower pole vascular anatomy, being the upper pole vessels much more complex in distribution. Although we cannot transpose the results to clinical setting, the study opened new avenue to enhance the possibility of partial nephrectomy.

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Sildenafil as a protecting drug for warm ischemic kidney transplants: experimental results

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Purpose: In an experimental model we studied the protective effects of the phosphodiesterase-5 inhibitor sildenafil on kidney grafts autotransplanted after 45 minutes of warm ischemia by vascular clamping, nephrectomy and 60 minutes of isolated hypothermic pump perfusion.

Materials and Methods: A total of 14 laboratory minipigs were divided into group 1-7 administered 100 mg sildenafil orally 1.5 hours preoperatively and group 2-7 in which no sildenafil was given. Right single nephrectomy was completed after 45 minutes of warm ischemia by complete vascular clamping. Before autotransplantation all kidneys underwent 60 minutes of hypothermic pulsatile perfusion. Renal flow, arterial pressure and renal vascular resistance were recorded in real time for 60 minutes after autotransplantation. Nitric oxide levels were determined in blood samples from the renal vein at predefined intervals. Optical and electronic microscopy was done in all organs at the end of the procedure.
Results: In group 1 vs 2 renal vascular flow was significantly higher (155.30 vs 29.04 ml per minute per 100 gm) and renal vascular resistance was significantly lower (0.59 vs 3.10 mm Hg/ml per minute, each $p < 0.01$). No significant differences were observed in systemic arterial pressure between groups 1 and 2 (84.08 and 84.65 mm Hg, respectively, $p > 0.05$). Nitric oxide levels were significantly higher for all periods in group 1 (49.94 vs 16.85 muM, $p < 0.01$). No significant differences were observed in histological studies, although endothelial cell structure was better preserved in the sildenafil group.
Conclusions: To our knowledge our study suggests for the first time in the literature a positive effect of sildenafil in the immediate posttransplantation outcome of warm ischemic kidneys without secondary systemic effects.

Editorial Comment

This a very elegant and complete study on the effects of sildenafil administered as a preconditioning drug before a period of warm ischemia to protect kidneys for transplantation in 14 minipigs. The authors analyzed its hemodynamic, biochemical and histological effects. The study demonstrated a beneficial effect of sildenafil on immediate post-transplantation reperfusion parameters in warm ischemic kidneys without significant systemic secondary effects. Since the kidney in pigs is very similar to humans from a physiological standpoint I believe that this new knowledge will be rapidly transposed to clinical setting.

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