

OMNEX Surgical Sealant in the Extracorporeal Repair of Renal Artery Aneurysms

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OMNEX (Ethicon, Inc.; Somerville, NJ) is a cyanoacrylate-based synthetic surgical sealant. To date, the use of OMNEX has only been described in a limited number of vascular surgery procedures. We present the cases of two patients who underwent successful extracorporeal renal artery aneurysm repair with the aid of OMNEX sealant. This report is the first evidence to suggest the utility of OMNEX in renovascular surgery.

Renal artery aneurysms (RAAs) occur in the general population with an incidence of approximately 1%.¹ The majority of patients present only after incidental finding on abdominal imaging. Others present with symptoms of hypertension, hematuria, or flank pain. The management of RAAs includes open aneurysmorrhaphy, arterial bypass, and endovascular repair.²⁻⁴ Previously, we have reported our experience with extracorporeal RAA repair and autotransplantation.⁵

OMNEX surgical sealant (Ethicon, Inc.; Somerville, NJ) was recently introduced as an adjuvant hemostatic agent for the closure of vascular suture lines.^{6,7} This cyanoacrylate-based sealant is chemically activated on mixing its two components (2-octyl cyanoacrylate and butyl lactoyl cyanoacrylate). To date, the utility of this reagent in the surgical repair of RAAs has not been evaluated. Herein, we report the first use of OMNEX for the repair of two complex RAAs.

CASE REPORT

Between January and February 2011, two patients presented to our care with complex RAAs. Patient 1 was a 64-year-old man who was found to have two right-sided RAAs measuring 21.5 mm and 9.4 mm on computed tomography scan for acute appendicitis. Patient 2 was a 59-year-old woman who was diagnosed with a 20.4-mm right-sided RAA after undergoing an evaluation for flank pain.

Following open nephrectomy, both patients' renal arteries were repaired ex vivo on the back table, as previously described.⁵ Patient 1 was found to have two aneurysms, and a complex arterial reconstruction was performed, which included six arterial anastomoses (Fig. 1). Patient 2 required an extension of the renal artery using an autologous segment of right internal iliac artery (Fig. 2). In both cases, ex vivo arterial reconstructions were performed with 7-0 prolene suture. OMNEX vascular sealant was then applied on the back table over these suture lines (Fig. 3). Once the repairs were complete, heterotopic autotransplantations were performed with anastomosis to the right external iliac vessels. Adequate hemostasis of both repairs was observed following release of the vascular clamps.

Renal ultrasonography of both patients on postoperative day 1 demonstrated patent vessels without evidence of hemorrhage or stenosis. The patients were discharged on postoperative days 5 and 6, and neither experienced a bleed in the perioperative period.

DISCUSSION

The surgical management of RAAs includes extensive vascular suturing. Bleeding of the site of repair

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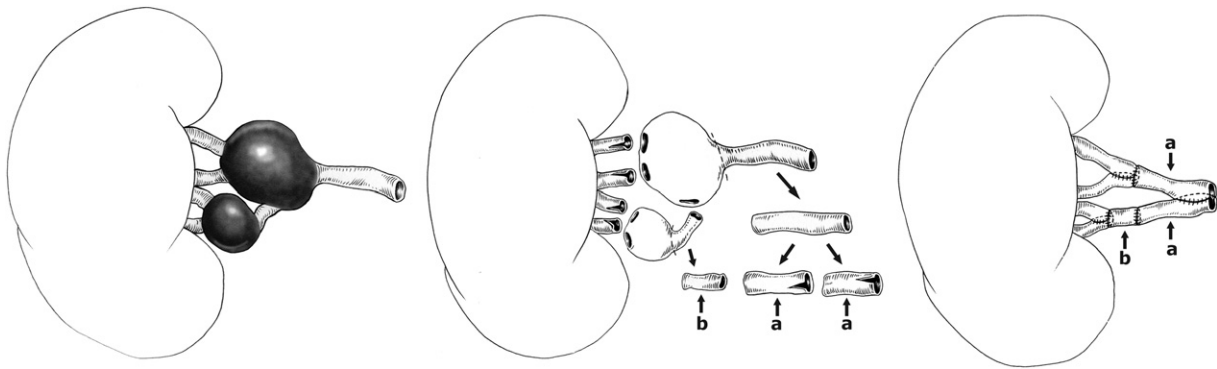


Fig. 1. Illustration of patient's renal artery reconstruction requiring six arterial anastomoses.

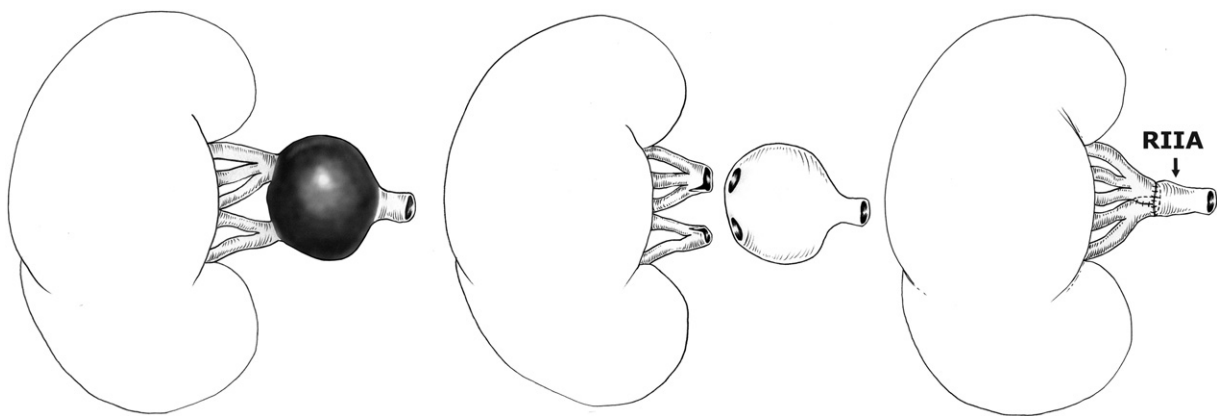


Fig. 2. Repair of patient 2's renal artery aneurysm using an autologous right internal iliac artery (RIIA) graft.

following graft reperfusion may require additional cross-clamping for suture line revision. This may result in prolonged ischemia time and potential luminal narrowing owing to the need for additional suture placement. Both outcomes may adversely affect renal function and undermine the intended goals of RAA repair. In light of the risk of bleeding, we sought to use OMNEX surgical sealant to reinforce the suture lines of the vascular reconstructions of two patients undergoing ex vivo RAA repair.

OMNEX is a cyanoacrylate-based synthetic sealant. This compound was approved by the US Food and Drug Administration in June 2010 as an adjuvant for the closure of vascular suture lines.⁸ OMNEX has previously been described in the context of arteriovenous access, abdominal aortic aneurysm, and femoral bypass procedures.^{6,7} Its use in the repair of RAAs has never been reported.

In the only comparative trial of this agent, OMNEX was found to achieve hemostasis in a mean time of 119.3 seconds. This was approximately 3.5 times faster than the control of oxidized

cellulose (403.8 seconds, $p < 0.001$).⁶ In addition, immediate hemostasis was achieved in 55% of patients who received OMNEX versus only 10% of those who received the control. This study was a multinational, randomized, open-label, controlled trial of 151 patients undergoing femoral bypass or shunt procedures for hemodialysis access.

Although other agents such as fibrin, thrombin, and oxidized cellulose have been developed to aid in hemostasis, there are two major advantages of OMNEX. First, OMNEX is a synthetic chemical sealant, which does not carry a risk of immunogenic reaction or communicable disease.⁹ This is in contrast to fibrin and thrombin, which are isolated biologics. These agents may either be isolated from animals (i.e., porcine or most commonly bovine) or from pooled human donors. Agents isolated from animals carry a risk of allergic reaction or antibody formation that may lead to coagulopathy.^{10,11} This risk has led to the Food and Drug Administration requiring a black box warning to be placed on such agents.¹² Similarly, agents isolated from

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