LETTER TO THE EDITOR

Use of the harmonic scalpel in cold phase recovery of the pancreas for transplantation: the westmead technique

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Dear Editors,

Pancreatic transplantation for the treatment of type I diabetes offers the current gold standard treatment for a previously incurable disease [1]. During our extensive experience with *en bloc* liver and pancreas recoveries, we noted the time-consuming nature of individually dividing vessels along the greater curvature of the stomach, in addition to dissection of the superior mesenteric pedicle close to the root of the small bowel mesentery. Additionally, small vessels around the pancreatic graft borders are often missed during cold phase dissection and are thus likely sources of blood loss during organ reperfusion in the recipient [2].

The ultrasonically activated Harmonic Scalpel (Smithfield, RI, USA) uses high-frequency ultrasound vibrations to cut and coagulate tissue [3]. The mechanical energy at the tip of the shear results in the denaturation of proteins, which then form a coagulum to produce haemostasis [3]. Direct comparisons between the Harmonic Scalpel (HS) and electrocautery have shown that the HS is associated with reduced operative time and bleeding [4,5].

Herein, we describe easily adaptable modifications to the *en bloc* technique incorporating pancreas recovery using the HS that allows for more timely and effective procurement of the organ; to our knowledge, the use of the HS has not yet been described for this procedure.

The standard technique for procurement of the pancreas for transplantation has been described in detail previously [6–8]. Our HS modification [the modified (Westmead) technique] to the standard recovery technique can be divided into *in situ* and *ex situ* phases.

In situ, the instrument is used for dissection around the greater curvature of the stomach, including division of the short gastric vessels. The HS is further utilized in mobilizing the splenic flexure of the colon, which is often surrounded by diffuse fatty and vascular tissue. This enables almost bloodless dissection down onto the pancreas and lower pole of the spleen and facilitates rapid skeletonization of the pancreas to allow its mobilization to the midline.

Following perfusion within the cold phase of dissection, the HS allows the sealing of small jejunal branches, facilitating the rapid and safe creation of a more defined superior mesenteric artery (SMA) and vein (SMV) pedicle inferior to the pancreatic head (Fig. 1a). This pedicle can then be easily and safely ligated with the single deployment of a vascular stapler, while ensuring minimal vessel leakage in the recipient. Complete *en bloc* removal of the liver–pancreas block then proceeds in a standard fashion.

Ex situ, the HS can also effectively be employed on the back-table for further clearing of extraneous tissues from the pancreas. We first use the device to separate the pancreas from the spleen via division of the splenorenal ligament. The splenic artery and vein are individually ligated with sutures, having skeletonized the vessels using the HS technique. It is then utilized for the removal of any remaining/excess fatty tissue around the body and tail of the pancreas, such that there is no further adherent tissue requiring removal at the recipient centre. We believe that the quality of the final recovered organ is significantly superior compared to cases when the HS is not employed

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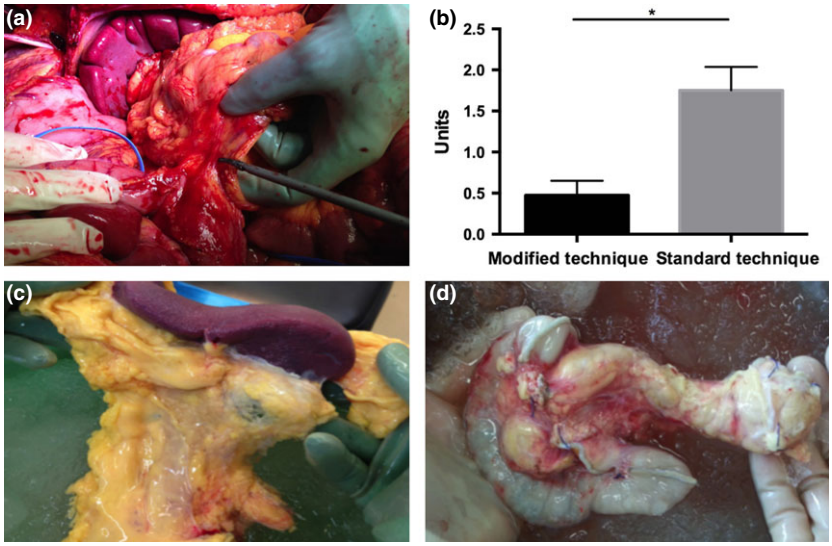

Figure 1 (a) Creation of a more defined SMA/SMV pedicle with the Harmonic Scalpel prior to stapling. (b) PRBC requirement in pancreas recipients by use of Harmonic Scalpel (modified (Westmead) technique) in the donor (n = 19 for Westmead technique, n = 36 for standard technique group) [*P < 0.01, Mann–Whitney test]. (c) Final back-table specimen after use of standard techniques and (d) after use of Harmonic Scalpel (Westmead technique).

(Fig. 1c,d), thereby facilitating a more timely implantation process at the recipient centre as little further dissection of the specimen is required.

In the period 2011–2015, there were 21 recipients of pancreas transplants where the donation surgery was performed using the Westmead technique (WT); 20 of these were simultaneous pancreas–kidney (SPK) transplants. One of 20 (5%) SPK transplant patients in the WT group underwent graft pancreatectomy due to graft vascular thrombosis compared to 6 of 102 (5.8%) in the standard technique group (P = 0.68), and it is thereby as safe from this perspective.

Blood loss and PRBC requirement in recipients of SPK transplants recovered using the WT (n = 19) were significantly less when compared to a random subset of SPK recipients of organs where the standard technique was used (n = 36). PRBC requirement was 1.8 units (95% CI 1.2–2.3) in the standard technique group compared to 0.5 units (95% CI 0.1–0.9) in the WT group (P < 0.01) (Fig. 1b). Mean blood loss in standard group was 928 ml (95% CI 533–1322), compared to 488 ml (95% CI 324–652 ml) in the WT group (P = 0.14).

It is unlikely that other confounding variables are responsible for the lower blood product requirement in the WT group as only SPK transplants were compared that were performed within the same unit by experienced surgeons with similar surgical techniques, with exclusion of patients on significant anticoagulation or antiplatelet therapy. Regardless, a difference in surgical technique may have partly contributed to the final result; a prospective, randomized trial would be able to definitively answer this. Blood product requirements in the standard technique group are comparable to the few reports in the literature regarding transfusions in pancreas transplant recipients [9,10].

Overall, the use of the HS is a modification that is technically safe and simple, yet allows rapid dissection of the pancreas with a subsequent reduction in blood loss upon reperfusion, especially from small peri-pancreatic vessels. Propagation of this method will likely improve recipient outcomes, or at a minimum stimulate interest in alternative technique(s) for pancreatic procurement. Further prospective, randomized comparative data are required to prove the effectiveness of the Westmead technique over more conventional strategies for organ recovery, especially with regard to back-table dissection and longer term recipient outcomes.

Author contributions

AH: writing of the paper, data acquisition/analysis/interpretation, revision of the paper and final approval. TY: writing of the paper, data acquisition and final approval. LY: data interpretation, revision of paper and final approval. VL: data interpretation, revision of paper and final approval. BR: data interpretation, revision of paper and final approval. RA: data interpretation, revision of paper, final approval and initial pioneering work

in pancreatic transplantation in Australia. JL: data interpretation/statistics, revision of paper and final approval. WH: data interpretation, revision of paper and final approval. HP: research design, data interpretation, revision of the paper and final approval.

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Conflicts of interest

There are no conflict of interests to disclose for any of the authors.

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