Experimental Small-bowel Homografts

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There are many clinical problems involving the small bowel which will be satisfactorily solved only after the development of methods for transplantation which allow reasonable hope for permanent survival. Investigations of the technical aspects of small-bowel homotransplantation as well as of the functional characteristics of this tissue are desirable so that immediate applications may be made when the rejection phenomenon is solved. In this article, experimental small-intestinal homotransplants carried out upon 18 normal dogs are reported.

MATERIALS AND METHODS

Adult mongrel dogs under intravenous Nembutal* anesthesia were used for all experiments. Sterile technic was employed.

Donor Animals

Through a midline abdominal incision, the root of the mesentery of the small bowel was located. The superior mesenteric artery and vein were palpated and mobilized, and umbilical tapes were placed around each vessel. At a site near the midportion, a segment of small bowel approximately 20 cm. in length was separated from the remainder of the small intestine. Arteries and veins supplying the portion selected to serve as the homograft were carefully preserved. All other branches of the superior mesenteric vessels were divided and ligated (Fig. 1). Normal circulation to the segment to be transplanted was maintained until division of the superior mesenteric vessels had been carried out. The bowel was then perfused through the superior mesenteric artery with a dilute heparin solution until it was grossly free of blood. It was then wrapped in a wet lap pack and immersed in an ice-saline mixture until the recipient had been prepared for implantation.

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**RECIPIENT ANIMALS**

A low midline incision afforded satisfactory exposure of the external iliac artery and vein. These vessels were generously mobilized and divided between clamps. The distal portion of each vessel was ligated. With the small-bowel homograft lying on the abdominal wall, the end of the superior mesenteric vein of the graft was anastomosed to the iliac vein by means of continuous over-and-over No. 00000 sutures. The femoral and mesenteric arteries were anastomosed in a similar manner. Bleeding at the suture line was controlled by pressure in most cases, with taking of additional sutures being necessary in a few instances. The mean period during which the graft was without circulation was about 3 hours. The longest period was 3 hours and 15 min. The peristaltic end of the homograft was closed with two layers of sutures; the antiperistaltic end was brought out through a stab wound. This arrangement was successful in preventing prolapse and intussusception. Each recipient animal received 500,000 U. of penicillin daily during the period of survival.

Eighteen animals were operated upon as described above and followed to determine survival time. Six additional animals were reoperated upon daily to secure gross photographs and biopsies up to 8 days following implantation.