AN ANTIREFLUX SPUR VALVE IN ROUX-Y ANASTOMOSIS

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Anti-reflux effect of Roux-Y anastomosis for choloenteric drainage is occasionally not adequate, and a life-threatening biliary sepsis may be resulted especially in the presence of post-operative ileus. In order to lessen the danger of the enteric contents flowing back into the bile tracts, since 1977, an anti-reflux spur valve added to Roux-Y anastomosis has been designed and practised. The procedure is as follows.

After an ordinary Roux-Y procedure has been completed, its two in-put loops, a biliary loop (B) draining biliary tracts and a gastric loop (G) leading from stomach and duodenum, are sutured side-by-side with two rows of stitches along their mesenteric and antimesenteric borders for a length of 5 cm from the anastomosis proximally (fig 1). Before suturing, a piece of seromusculature is excised from the wall of loop B at the site to be sutured involving the whole area facing the corresponding part of loop G (fig 2). This procedure will result in a nonabsorbable adhesion between the sutured part of loop B and loop G, so called the “spur”, and will keep these two loops in parallel position permanently at the Roux-Y anastomosis (fig 3). At the sametime, this procedure will also result in marked compression of the lumen of loop B from its one side as shown in figure 4 (fig 4). Consequently, this procedure will have the effect of preventing the free backflow into loop B. In case of intestinal obstruction, loop G will be distended as well as the distal loop (D), while loop B will be further compressed by the adjacent loop G. The more the distension of loop G, the more the distension of loop G, the more the compression of loop B will be (fig 5). And therefore, reflux would be prevented even in acute intestinal obstruction. This effect has been well demonstrated in animal experiments and also in patients on the operation table.

Five dogs were used as the experiment animals, another 5 as the controls. Upper jejunum of 60 cm long was resected with its mesentric vessels kept intact. This resected loop was redived into two segments, 40 cm and 20 cm respectively. A “T” anastomosis was performed with the end of 20 cm segment to the side of the 40 cm segment at its middle portion. In every experimental animal a spur valve was made, while in those controls the “T” anastomosis was just left in its natural position. All the three stomes of every experimental loop were exteriorized and marked with B, G and D on the abdominal wall. Tests were done during the operation, one month later, 3 month later and 6 month later respectively by injecting water into the three stomes separately. Practically the same results obtained in every animal of each group were as follows.

In experimental group:
1. water injected into loop B came out freely from loop D;
2. water injected into G came out from D freely;
3. water injected into D came out from G, not B;
4. water injected into D, with G being clamped, never came out from B even D and G being distended under a pressure upto 200 mm Hg.

In control group:
1. water injected into B came out from D freely;
2. water injected into G came out from D, sometimes B;
3. water injected into D came out from B, less from G;
4. water injected into D, with G being clamped, came out freely from B but unable to keep a pressure.

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Six month after operation, the whole model loop was removed. Cross-section at the spur was made, and it revealed an asymmetrical double lumen, a round one and a crescent one.

Clinically, since 1977, all together 24 spur valve Roux-Y anastomosis had been performed: 7 re-explorations and spur valve Roux-Y for recurrent intra-hepatic cholangitis after previous internal drainage of choledocal cyst either by cysto-duodenostomy or by conventional Roux-Y (Among 128 cases of congenital choledocal cyst in the past 25 years, there seemed to be no significant difference between these two kinds of internal drainage in terms of the incidence of post-operative recurrent intra-hepatic cholangitis); 8 hepato-porto-enterostomies and spur valve Roux-Y for neonatal biliary atresia; 5 spur valve Roux-Y operations for choledocal cysts, either following excision of cyst or just an internal drainage; 4 for other obstructive jaundice due to stricture or other causes. Immediate post-operative courses of all cases were uneventful although none of the babies with biliary atresia survived longer than one year.

During operation the following routine test had been done on every patient. After the spur was made, gas in distal loop of the Roux-Y was tried to be squeezed backward into the proximal loop or sometimes oxygen was blowed into the intestine through a nasal gastric tube. Gas passing into duodenum and jejunum causing distension but not into loop B toward the biliary tracts would demonstrate a successful operation. In a case of stricture of common bile duct, re-exploration for stones was performed one year after the primary spur operation. It was proved that the spur valve was still working very well by repeating the above mentioned test.
This is however only a preliminary study, because of the small number of clinical cases, the short duration of follow-up and especially the low incidence of ascending infection following the ordinary Roux-Y operation or even the direct cystoduodenal drainage. No recurrent ascending infection in a certain period of time doesn't prove a perfect protection, and similarly an occasional ascending infection also doesn't mean a gross reflux. The real value of this procedure will be worked out until a larger group of patients with longer follow-up has been collected and analyzed.