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Duodenoplasty in the management of duodenal atresia

P. A. Dewan and E. J. Guiney

Children's Research Centre, Our Lady's Hospital for Sick Children, Crumlin, Dublin 12, Ireland

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Abstract. When the duodenum is congenitally obstructed it becomes distended to varying degrees. Our case of combined duodenal and multiple jejunal atresias indicates the value of duodenoplasty for symptomatic duodenomegaly diagnosed in late childhood. The technique used has restored duodenal motility and is recommended for selective use as part of the primary surgery for duodenal and proximal jejunal atresia.

Key words: Duodenal atresia – Tapering duodenoplasty

Introduction

Duodenal atresia presents with bile-stained vomiting soon after birth and a plain abdominal radiograph showing a "double bubble". The second bubble represents a dilated duodenum secondary to the obstruction; now that duodenoduodenostomy (DD) has become standard, the possible role of reducing the size of the proximal duodenum has recently become evident as the different methods of DD are compared [13].

A study of early duodenal function [14] and another on late follow-up [3] suggest that narrowing the dilated duodenum improves results. Our case adds further evidence to the argument for the addition of duodenoplasty (DP) to the surgical management of high congenital midgut obstruction, but further investigation is needed to establish in which neonatal cases the procedure is required.

Case report

A female infant was born 4 weeks prematurely in a London Hospital with birth weight 2.6 kg. On day 2 of life bile-stained vomiting and a "double bubble" on a plain abdominal radiograph led to a laparotomy at which duodenal atresia and multiple jejunal atresias were found. The fourth part of the duodenum and the atretic portions of jejunum were resected and an end to end duodenojejenostomy (DJ) was performed. The subsequent, early course was uneventful.

The patient first came to medical attention in Ireland in 1985, at the age of 11 years. She presented with nose bleeds and failure to thrive secondary to malabsorption. Investigations showed hypocalcaemia, vitamin K deficiency, a large stagnant bowel loop on barium meal, and radiological evidence of rickets. Conservative treatment was instigated with one alpha cholecalciferol, calcium, vitamin K, and antibiotics. Vomiting became an increasing problem and pubertal development was subsequently noted to be retarded. The girl was first admitted to this hospital in January 1988 with repeated vomiting. Her abdomen was protuberant and had a succussion splash; she was growth retarded and again hypocalcaemic.

A laparotomy was performed at which a duodenotomy revealed two unsuspected stones ($7 \times 5 \times 2$ cm and $3 \times 2 \times 1$ cm). The very large duodenum was not resected as it was felt the stones were causing the obstruction rather than the duodenojejunal anastomosis, which was widely patent. Histologically the "stones" were composed of compacted food debris.

Two further peripheral hospital admissions ensued 6 and 8 months later, precipitated by vomiting and marked dehydration had recurred shortly after her "stones" were removed. A barium meal showed enormous duodenal ectasia (Fig. 1) and a second laparotomy was undertaken in March 1989. The duodenum measured 25×50 cm and a copious volume of food debris was found in both stomach and duodenum.

The thick walled duodenum was resected along its anterolateral wall, and part of the distal duodenum was completely resected. The DP produced a 5-cm diameter lumen, similar to the dimension of the reanastomosis to the jejunum. Transanastomotic tube feeds were commenced at 6 days, a soft food diet was started on day 13 postoperatively, and the patient was discharged on the day 15. Histology of the duodenum showed mild chromic inflammation, muscle hypertrophy, and normal ganglion cells.

Four months later her abdomen was flat and she was tolerating a normal diet and gaining weight. Her latest radiology shows a duodenum of almost normal calibre without any delay in emptying (Fig. 2).

Discussion

Previous papers on congenital duodenal obstruction have compared the results of gastroenterostomy, DJ, and DD and found better functional and survival results from the direct anastomosis of the proximal and distal duodenum [4, 12, 15]. Weber et al. [13] have analysed the outcome from different techniques of anastomosing the duodenal ends and found the "diamond" anastomosis to be superior.

Offprint requests to: E. J. Guiney

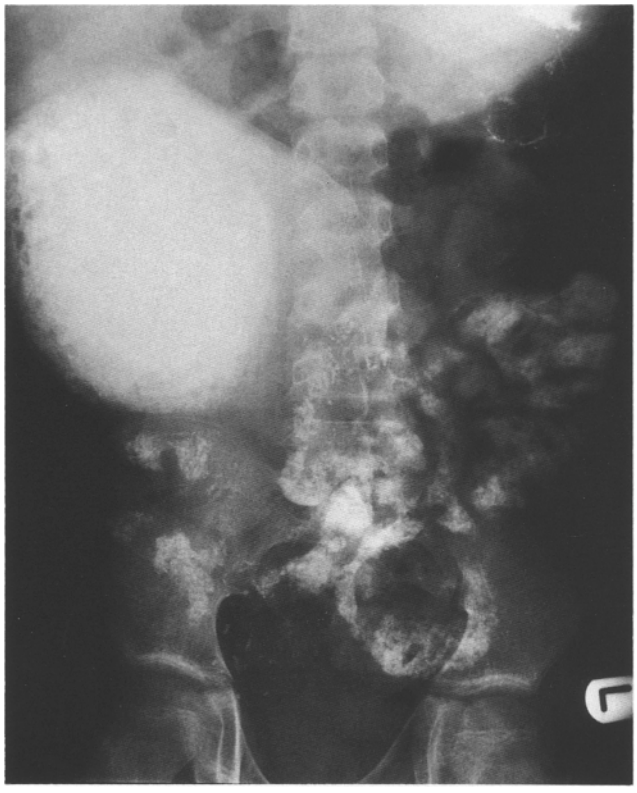

Fig. 1. Barium study performed prior to the most recent laparotomy. The duodenum is massively dilated

However, each type of DD has its proponents [7, 11]. Additional investigations on the inclusion of DP in the operation are limited, but comparable work on small bowel by Louw [8] and Nixon [9] demonstrated an absence of effective peristalsis in greatly dilated gut, a phenomenon thought to occur in the grossly dilated duodenum proximal to a duodenal or high jejunal atresia. Hutton and Thomas [6] have reported success with the type of DP used in our patient, which was similar to the jejunoplasty described by Howard and Othersen [5].

Several other techniques of DP have been described. They include resection and suturing [2, 14], resection and stapling [1], or imbrication [10], with either DD for duodenal atresia [1, 2, 14] patients or DJ for those with proximal jejunal atresia [2, 6].

Weisgerber and Boureau [14] found improved early duodenal function in 25 duodenal atresia patients who had a resection of part of the dilated duodenum at the time of their initial operation and Ein and Shandling [3] have reported cases similar to ours where late DP produced effective duodenal peristalsis. However, Stauffer and Irving [12] had duodenal emptying problems in only 5 of 32 late follow-up duodenal atresia patients, which makes it difficult to advocate routine DP as recommended by others [2, 3].

Extensive duodenal resection allows earlier feeding and prevents late duodenomegaly, but adds significantly to the operative risk with possibly no great benefit in many cases.

In order to define the indications for neonatal DP further studies are needed to correlate initial duodenal size with long-term functional outcome, which would then allow rational selection of those for DP. However, DP

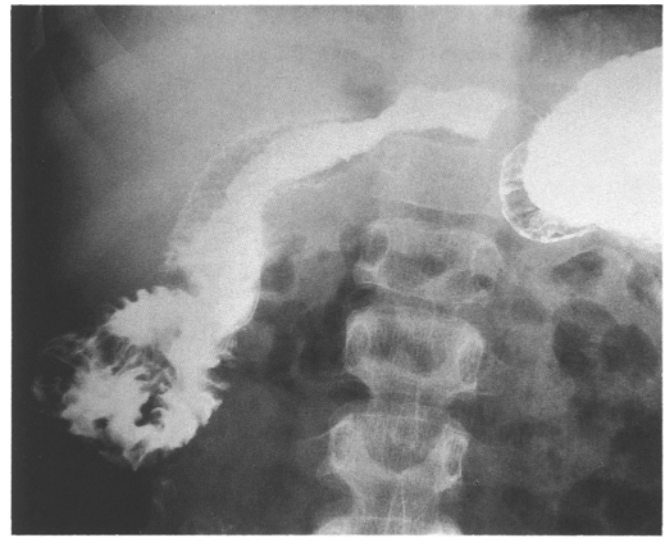

Fig. 2. Follow-up barium contrast study 3 months after extensive duodenal resection

obviously has a role in the management of subsequent functional duodenal obstruction, especially when malabsorption is present as in our patient.

Our case also indicates that a smooth postoperative course in duodenal atresia patients does not guarantee continued normal duodenal function and late follow-up is necessary.

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