

## **Surgery for Congenital Duodenal Atresia**

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**ABSTRACT:** Congenital duodenal atresia consists of extrinsic duodenal obstruction of annular pancreas and intrinsic obstruction of intestinal atresia. The aim of this study is to clarify clinical patterns of congenital duodenal atresia on the basis of surgical experience and discuss major problems with respect to surgical treatment.

### **MATERIALS AND METHODS**

Nine patients with congenital duodenal atresia were operated upon at the First Department of Surgery, Nagasaki University School of Medicine.

Sex distribution was 4 boys and 5 girls. Their body weight ranged from 1730g to 3500g, premature baby under 2500g in body weight was only one.

The genesis of duodenal obstruction was membranous obstruction in 4, membranous stenosis of Windsock Web type in 2, duodenal stenosis by annular pancreas in one and duodenal obstruction by annular pancreas in 2 respectively.

Associated anomalies were Dawn's syndrome in 2, diaphragmatic hernia in one. Malrotation of the gut in 4, ventricular septal defect in one, and meckel diverticulum in 1 respectively.

Prenatal diagnosis was definitively made in 4 out of 9, and hyeramnion accompanied in 5. The methods of operation are membranotomy in 5 with membranous obstruction, Ladd' operation in 3 with malrotation of the gut, patch repair for diaphragmatic hernia, duodeno-duodenostomy by the transverse, and longitudinal duodenal incision (diamond shape anastomosis) in 4.

The duration before oral intake ranged from 4 days to 43 days. The longest time of 43 days was needed in a patient with membranotomy which reflected incomplete resection. All other patients but one began oral intake 4 to 14 days following surgery. The most favorable result was obtained in patients with duodeno-duodenostomy by diamond-shape anastomosis. Postoperative complications occurred in 5. One of them was anastomotic stenosis which delayed oral intake for 43 days. Three were hyperbilirubinemia needed ultra-violet ray therapy, and the other was respiratory distress ended to death.

One died of operative death of respiratory failure following repair for diaphragmatic hernia in combination with membranotomy for duodenal atresia and Ladd' operation for malrotation of the gut. However, the surgical outcome for congenital anomaly in neonates was satisfactory.

### **DISCUSSION**

It is widely accepted that intrinsic duodenal obstruction is mainly based on membranous type. In this series six patients except for 3 cases with annular pancreas had obstruction of membranous type. As reported by Fonkalsrud<sup>1)</sup>, the stenosis of wind-sock type is common.

**Table** Patients with congenital duodenal atresia

Case	Sex	pre-term	birth wt	Obstruction type	complication	op
1	F	37 w	2550 g	membranous		resection
2	F	41 w	2880 g	membranous stenosis	malrotation hyperbilirubinemia Dawn	resection Ladd'
3	M	41 w	3150 g	memb		duodeno-duodenostomy
4	M	36 w	2860 g	memb	diaphragmatic hernia respiratory distress malrotation	resection Ladd' repair of diaphragma
5	F	40 w	3500 g	memb stenosis*	malrotation	resection Ladd'
6	M	39 w	2760 g	stenosis (annular pancreas)		duodeno-duodenostomy
7	M	40 w	2626 g	memb		resection
8	F	38	1730 g	stenosis (annular pancreas)	hyperbilirubinemia	duodeno-duodenostomy
9	M	39 w	2610 g	stenosis (annular pancreas)	hyperbilirubinemia malrotation Dawn'	duodeno-duodenostomy Appendectomy

\* Windssock web type

Intrinsic duodenal stenosis occurs anywhere in the duodenum, but it takes place more often in the descending portion of the duodenum<sup>2)</sup>. And also it is known that 75% of the patients with duodenal membranous obstruction are detected around the site of the orifice of the ampulla (Varter)<sup>3)</sup>.

It is embryologically clarified that the development of the duodenum has a close relationship to that of the pancreatobiliary tract as called embryological traffic jam by Boden *et al*<sup>4)</sup>. They confirmed that complex developmental process of the descending portion of the duodenum progresses in accordance with recanalization process of the gut from 5 to 8 weeks of gestation. Therefore, it is necessary to note a presence of pancreatobiliary system at surgical repair.

The operation method of duodeno-duodenostomy has been widely used for surgery of duodenal obstruction including extrinsic duodenal obstruction. It is recognized that annular pancreas is originating from abnormal rotation of the pancreatic bud which rotates backwards, adhering to the anterior portion around the duodenum at 6th week of gestation.

On the other hand, it is also accepted that the cause of intrinsic duodenal obstruction mainly comprises of membranous obstruction

or stenosis which is arising from developmental anomaly of over-proliferation of duodenal epithelium at 6th to 9th week of gestation<sup>4,5)</sup>.

The bypass-operation has been used for release of duodenal obstruction. However, the drawback to this procedure is that it takes a long time to initiate oral intake from the reasons of hypofunction of the stomach and duodenum, stenotic orifice at anastomosis and circuit formation of the duodenum and jejunum<sup>6)</sup>.

At present it is recommended that duodeno-duodenostomy by the transverse and longitudinal duodenal incisions on the oral and anal duodenum (diamond-shape) should be the best preventive procedure making the orifice at anastomosis larger and to avoid circuit formation of the duodenum and jejunum.

In this study, the advantageous early oral intake has been achieved within 4 days.

However, one died of respiratory distress with associated anomalies of diaphragmatic hernia and malrotation of the gut. It is suggestive that baby's death might be due to hypoplastic lung and aspiration pneumonia.

Surgeons should be aware of the timing of repair for associated and undevelopmental anomalies in relation to surgical risk.

**REFERENCES**

- 1) Fonkalsrud EW : Congenital atresia and stenosis of the duodenum. *Pediatrics* 43:79, 1989.
- 2) Rickan PP : Duodenal atresia. Neonatal surgery, 2nd Ed P355.
- 3) Nakai H. Margaretten W : Protracted jaundice associated with hypertrophic pyloric stenosis. *Pediatrics* 29 : 198, 1962.
- 4) Boyden EA : Anatomy and embryology of congenital intrinsic obstruction of the duodenum. *Am J. Surg.* 114:190, 1967.
- 5) Tendler MJ D Ciuti A : The surgery of annular pancreas. A summary of sixty patients operated upon surgery 38 : 298, 1955.
- 6) Feuchtwanger MM and Weiss Y : side to side duodenostomy for obstructing annular pancreas in the new born. *J. Pediat. Surg.* 3 : 398, 1968.