A Classic Case of Annular Pancreas and its Clinical Implications

Un Caso Clásico de Páncreas Anular y sus Implicaciones Clínicas

****Satheesha Nayak B. & **Ooi Mun Yooi**

NAYAK, B. S. & MUN YOOI, O. A classic case of annular pancreas and its clinical implications. *Int. J. Morphol.*, 29(2):559-561, 2011.

SUMMARY: Annular pancreas is a rare developmental anomaly where the head of the pancreas surrounds the second part of the duodenum like a ring. This may cause the duodenal constriction, obstruction, peptic ulcers and other complications. We saw a classic case of annular pancreas. The head of pancreas surrounded the second part of duodenum completely. However there was no narrowing of the duodenum. The case may be of importance for gastroenterologists, surgeons and radiologists.

KEY WORDS: Pancreas; Annular pancreas; Duodenum; Anomaly.

INTRODUCTION

The pancreas is a soft lobulated gland that is situated close to the posterior abdominal wall. It is about 15-20 cm long and weighs about 90 gm in weight. It is a mixed gland; partly exocrine and partly endocrine. The exocrine part is represented by the serous pancreatic acini and drained by a major and an accessory pancreatic duct. The major pancreatic duct joins with the common bile duct to form the hepatopancreatic ampulla which opens into the second part of the duodenum on the summit of the major duodenal papilla. The accessory pancreatic duct opens into the second part of the duodenum on the summit of the minor duodenal papilla. The endocrine part is represented by islets of Langerhans which secrete insulin and glucagon. The pancreas has a head, a neck, a body, a tail and an uncinate process. The head fits into the curve of the duodenum, the body crosses in front of the vertebral column and the tail touches the hilum of pancreas. All the parts except the tail are retroperitoneal. We observed only one case of annular pancreas among more than 100 cadavers dissected in the last fifteen years.

CASE REPORT

During routine dissection for the undergraduate medical students, we observed the classic annular pancreas.

This anomaly was noted in cadaver age 50 years approximately. The head of the pancreas made a circle around the second part of the duodenum (Fig 1). The annulus was also closely related to the inferior surface of the right lobe of the liver and the anterior surface of the right kidney and the right renal vessels. The neck, body and tail of the pancreas were normal and had the normal relations. There were no other notable variations in the cadaver.

DISCUSSION

One of the most interesting but rare variations of the pancreas is the condition known as the 'annular pancreas'. In this condition the descending part (2nd part) of the duodenum is surrounded by a ring of pancreatic tissue that is continuous with the head of the pancreas. It may be associated with a constriction of the duodenum at the location of the ring, with dilations above and below. The pancreas develops from the endoderm of the caudal end of the foregut. Its development begins with the formation of a dorsal and a ventral pancreatic bud. The dorsal bud grows in the dorsal mesentery and the ventral grows in the ventral mesentery of the duodenum. Later the ventral bud rotates along with the rotation of the duodenum and fuses with the dorsal pancreatic bud. The dorsal pancreatic bud forms the upper part of the

*Professor of Anatomy Melaka Manipal Medical College, Manipal University, Manipal, India.

**Final year Medical Student, Melaka Manipal Medical College, Manipal University, Manipal, India.

head, neck, body and tail of the pancreas where as the ventral bud forms the lower part of the head and the uncinate process. In some cases, the ventral bud divides into right and left parts. The two parts then surround the second part of the duodenum like a ring and cause annular pancreas (Moore & Dalley, 2006). Though this is a congenital anomaly, it may remain asymptomatic throughout life and may go unnoticed. On the other hand, it may cause duodenal constriction and obstruction at any age. It may result in inflammation or malignancies of the annulus. This anomaly affects males more commonly than females and is also associated with peptic ulcers. Fu *et al.* (2005) have reported two cases of annular pancreas resulting in duodenal ulcers in childhood. Miyazawa *et al.* (2004) have observed the case of annular pancreas in an adult male aged 40, who had abdominal pain, nausea and vomiting. MRI with cholangiopancreatography can play a decisive role in achieving the correct diagnosis for annular pancreas (Cunha *et al.*, 2005). Jimenez *et al.* (2004) have made an extensive review of patients with annular pancreas. In their study, 25% of the patients were premature, 75% presented during the first week of life and the remainder within the first year. 94% presented with vomiting, which was nonbilious, 31% had chromosomal anomalies, and 38% had other major congenital malformations.

Paraskevas *et al.* (2001) have found and operated only three cases (two male, one female) of annular pancreas in three decades. Diagnosis was made using imaging techniques, especially ultrasonography and computed tomography. The obstruction was incomplete in two cases; while in the other obstruction was complete. In the first case gastroenterostomy and truncal vagotomy was performed, in the second latero-lateral duodeno-jejunosomy and in the third latero-lateral antropyloroduodeno-jejunosomy. Maker *et al.* (2003) have done an extensive review of annular pancreas cases presented in a century. According to them, despite all present diagnostic tools including endoscopic retrograde cholangiopancreatography diagnosis at best is made in only 60 per cent of patients preoperatively. Enteroenterostomy seems to be the intervention of choice for a multitude of

Fig. 1. Photograph of liver, gall bladder, duodenum and pancreas. Note the annulus around the duodenum (GB – gall bladder, CT – celiac trunk, SA – splenic artery, CHA – common hepatic artery, D – duodenum, AN – annulus formed by the head of the pancreas, BP – body of the pancreas, SMA – superior mesenteric artery with its branches.)

anatomic and physiologic reasons and with a wide array of surgical options available when additional factors need to be addressed.

Any vomiting or abdominal pain cannot be ignored at any age group. Though very rare, the possibility of annular pancreas has to be kept in mind and a scanning could be recommended to rule out the possibility of annular pancreas in such cases. Asymptomatic annular pancreas may cause complications in abdominal surgeries. Since the annulus lies in close relation to the right kidney, liver and renal vessels as seen in the current case, it has to be preserved carefully during kidney transplants and liver surgeries. The surgeons may remove annular pancreas along with kidney because the annulus resembles the fat surrounding the kidney. Its removal may lead to leaking of pancreatic juice and cause damage to the surrounding tissue by the active pancreatic enzymes.

NAYAK, B. S. & MUN YOOI, O. Un caso clásico de páncreas anular y sus implicaciones clínicas. *Int. J. Morphol.*, 29(2):559-561, 2011.

RESUMEN: El páncreas anular es una rara anomalía del desarrollo, donde la cabeza de este órgano rodea, como un anillo, la segunda parte del duodeno. Ésto puede causar constricción y obstrucción duodenal, úlceras pépticas y otras complicaciones. Reportamos un caso clásico de páncreas anular. La cabeza del páncreas rodeó la segunda parte del duodeno por completo. Sin embargo, no hubo una estenosis duodenal. Este caso puede ser de importancia para los gastroenterólogos, cirujanos y radiólogos.

PALABRAS CLAVE: Páncreas; Páncreas anular; Duodeno; Anomalía.

REFERENCES

- Cunha, J. E.; de Lima, M. S.; Jukemura, J.; Penteadó, S.; Jureidini, R.; Patzina, R. A. & Siqueira, S. A. Unusual clinical presentation of annular pancreas in the adult. *Pancreatology*, 5(1):81-5, 2005.
- Fu, P. F.; Yu, J. R.; Liu, X. S.; Shen, Q. Y. & Zheng, S. S. Symptomatic adult annular pancreas: report of two cases and a review of the literature. *Hepatobiliary Pancreat. Dis. Int.*, 4(3):468-71, 2005.
- Jimenez, J. C.; Emil, S.; Podnos, Y. & Nguyen, N. Annular pancreas in children: a recent decade's experience. *J. Pediatr. Surg.*, 39(11):1654-7, 2004.
- Maker, V.; Gerzenshtein, J. & Lerner, T. Annular pancreas in the adult: two case reports and review of more than a century of literature. *Am. Surg.*, 69(5):404-10, 2003.
- Miyazawa, M.; Muto, A.; Sato, M.; Koyama, K.; Endo, H. & Ashino, Y. A case of annular pancreas in a male adult. *Fukushima J. Med. Sci.*, 50(2):75-81, 2004.
- Moore, L. L. & Dalley, A. F. *Clinically oriented anatomy*. 5th ed. Philadelphia, Lippincott, 2006. pp.264-5.
- Paraskevas, G.; Papaziogas, B.; Lazaridis, C.; Gigis, P. & Papaziogas, T. Annular pancreas in adults: embryological development, morphology and clinical significance. *Surg. Radiol. Anat.*, 23(6):437-42, 2001.

Correspondence to:
Satheesha Nayak B.
Professor
Department of Anatomy
Melaka Manipal Medical College (Manipal campus)
International Centre for Health Sciences
Manipal-576104
Karnataka
INDIA

Phone: 91 820 2571201 extn 22519
91 9844009059

Email: nayaksathish@yahoo.com

Received: 10-05-2010
Accepted: 19-01-2011