church bell; and (c) the outline of the upper abdomen is protuberant, while the outline of the lower abdomen is normal.

(2) A soft tissue radiograph may have located the low lying placenta. Other methods of radiological diagnosis such as: (a) measuring the distance between the head and sacral promontory with the patient partially reclining and measuring the distance between the symphysis pubis and head in the erect position; and (b) cystography, would not have been any help as the head was not presenting. Amniography is not a procedure practised now.

(3) Ultrasonic scanning would have helped to locate the position of the foetal head and placenta.

Cases of omphalocele ruptured and unexplained have been reported on various occasions (Lothian, 1959; Williams *et al.*, 1960; Leroux, 1961) but most of these have been diagnosed after delivery.

If diagnosed earlier, would it have influenced management?

In this instance, as there was bleeding due to the co-existing placenta praevia, one could argue that missing the diagnosis of exomphalos did not make a difference to the management, the management being immediate delivery, and this was by Caesarean

section in the presence of only two fingers-breadth dilatation of the cervix.

Alternatively, if the condition of this malformed foetus had been diagnosed, one might have waited until the cervix was dilated to four fingers-breadth and then performed an internal podalic version thus keeping pressure on the placenta with a half breech until full dilatation, when vaginal delivery would have been possible, thus sparing this young unmarried girl a scar in her uterus.

Acknowledgment

I am deeply indebted to Mr I. A. Donaldson, the Consultant in charge of this case for his kind permission and encouragement to publish the case.

References

- AIRD, D. (1962) An unusual presentation simulating placenta praevia. *Brit. J. clin. Pract.* **16**, 773.
- FAWCITT, J. (1953) The radiological diagnosis of exomphalos. (With a report of a case.) *Brit. J. Radiol.* **26**, 210.
- LEROUX, P. (1961) A case of intrauterine rupture of amniotic hernia with total evisceration of the small intestine. *Bull. Fed. Gynaec. Obstet. franc.* **13**, 208.
- LOTHIAN, W. (1959) A congenital amniotic hernia with the placenta adherent to the sac. *Practitioner*, **183**, 75.
- WILLIAMS, A. *et al.* (1960) Intrauterine rupture of omphalocele. *Virginia Med. Monthly*, **87**, 94.

Intussusception following gastric surgery

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ACUTE intussusception as a complication of gastric surgery is now a well-known though still uncommon event. That intussusception may occur in a chronic intermittent self-reducing form is a less widely recognized fact, and may be the cause of recurring gastro-intestinal symptoms. Eventually, the intussusception may fail to reduce and become incarcerated.

Case report

L.S., male aged 61 years, was admitted as an emergency. Following an early morning bout of sharp upper abdominal pain, he had been seized with severe continuous epigastric pain. He had vomited twice, the first occasion coffee-grounds, the second blood-stained mucus.

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He had had a gastric operation 15 years previously in Australia and had had numerous episodes of pain, flatulence and distension since then, but one more severe episode 5 weeks previously while in Vienna had resulted in a barium meal being carried out—this was reported as normal.

Since a heart attack 3 years ago, he had been on anticoagulants but had not received any other regular drugs.

On examination, he was thin; there was an upper abdominal mass most prominent in the left hypochondrium which appeared to be as two unequal incomplete halves like an inverted cottage loaf. It was very tender and fixed. The remainder of the examination was unremarkable.

Investigations. 15.5 g/100 ml, PCV 45%, serum amylase 320 units (normal 0–200), Na, 131 mEq/l,

Cl, 99 mEq/l; urea, 85 mg/100 ml. Prothrombin time 20 sec (control—15 sec). The ECG showed no recent change.

A plain X-ray of the abdomen showed a U-shaped dilated loop of small bowel in the left upper quadrant. A large fluid level beneath the left leaf of the diaphragm was seen in the erect film.

Operation was carried out after initial correction of fluid loss (a further 350 ml of altered blood had been aspirated via a nasogastric tube) the initial diagnosis being efferent loop obstruction; this was shown to be correct but not in the manner suspected for the efferent limb (an ante-colic partial gastrectomy with a long afferent loop had been carried out) had intussuscepted into the gastric remnant. Sixty centimetres was successfully reduced, mainly by pressure delivered via the gastric remnant, aided by traction from below: the bowel though dull and discoloured appeared viable. No cause for the intussusception was seen and no attempt was made at fixation. Post-operative recovery though hampered by a chest infection was uneventful, the elevated blood urea returning to normal.

Discussion

The first gastroenterostomy was carried out by Wölfler in 1881 (Wölfler, 1881), but it was not until 1914 that acute obstruction due to intussusception of the gastroenterostomy stoma was briefly annotated by Bozzi (1914) followed by a fuller description by Steber (1917). Since then a number of reports have appeared and intussusception has been described following gastroenterostomy, gastroenterostomy with truncal vagotomy (Irons & Lipin, 1955) or involving the enteroenterostomy stoma from either afferent or efferent limb of a gastroenterostomy without entering the stomach (Jääskeläinen, 1954; Frederick & Sizer, 1965). It has also followed a partial gastrectomy (McNamara, 1944) for benign ulcer and even 8 years after partial gastrectomy for carcinoma (Lavadia, Haynes & De Bakey, 1953) and may involve either limb of a Roux-en-Y anastomosis following total gastrectomy (Davey, 1954; Freeman, Bernatz & Brown, 1966), and has occurred onto a nasogastric tube (Reyelt & Anderson, 1964).

The main features of intussusception following gastric surgery have been obtained by an analysis of all the cases described in the English language literature from 1918 to 1968. There were 115 patients, ninety-two were male. This sex bias follows the greater incidence of peptic ulcer disease in the male. The age range was 28–79 (in seven cases the age was not stated) with a mean of 53 years. In sixty-seven cases a gastroenterostomy had been performed: in the remainder a variety of other gastric procedures had been carried out with the

exception of a Bilroth I partial gastrectomy. The shortest interval following gastric surgery was 2 days (Soteropoulos, Berkmen & Gilmore, 1959) and the longest 30 years (Coates, 1949) though the mean interval was 9 years. Nineteen cases could be described as chronic or self-reducing.

Shackman (1940) suggested that jejuno gastric intussusception (and this form of post-gastroenterostomy intussusception where the intussusception enters the stomach is by far the commonest) should be classified into: (i) afferent intestine involved, (ii) efferent intestine involved, and (iii) both afferent and efferent intestine involved. In seventy cases the efferent limb was involved, in six the afferent and in six both limbs were involved. There was insufficient evidence to classify the remaining thirty-two. While this classification is anatomically interesting, it probably merely underlines the relative fixation of the duodenum and it is not always possible, except in those cases operated upon or coming to post-mortem to be certain of the part of the intestine involved.

It appears to be more important to note that acute or chronic intussusception may occur and that while acute intussusception may occur following a history of gastro-intestinal symptoms it may closely follow another unrelated operation, e.g. trans-urethral resection of prostate (Grimes, 1949), haemorrhoidectomy (Mason, Williams & Marshall, 1960), or excision of cervical disc (Avakoff & Smith, 1965).

Clinically, the cardinal symptoms and signs are a previous surgical scar, pain and vomiting, and abdominal mass and haematemesis. In the chronic case pain and vomiting were present together in fifteen of nineteen cases but without a mass or haematemesis. A palpable mass suggests that the intussusception is unlikely to reduce spontaneously and all ten patients who presented with a mass but no haematemesis, were operated upon and recovered. Once haematemesis supervenes (due to engorgement of the incarcerated bowel) operation is urgent; it is difficult to assess the delay in the reported cases but four out of fifteen patients died (including one managed conservatively) who presented in this way. Even more important is that twenty-six out of the ninety-six acute cases presented with haematemesis *but no mass* and nine of eleven such cases managed conservatively died whereas only two out of fifteen cases operated on died. This latter group provides a further reason for the early investigation with contrast studies of haematemesis in patients with a previous history of gastric surgery. Radiography is particularly useful in the chronic cases and plain (Robertson & Weder, 1968) and contrast X-rays (Jackman & Middlemiss, 1961; Virtama & Jankala, 1961) are helpful. The

latter has emphasized the striated filling-defect which may be seen in the gastric outline, gastric retention and dilation, or delay in emptying with displacement of the pylorus (if present) to the right, and poor visualization of the gastroenterostomy stoma. Devor & Passaro (1966) have described the appearances seen at gastroscopy following a negative barium study.

Aetiology. No constant anatomical arrangement can be detected other than the mobility of the more commonly affected efferent limb, and the possible role of posture in the chronic recurrent case. In only one case—that described by Rastogi *et al.* (1968)—did an associated disease, multiple neurofibromatosis appear to be a predisposing case.

One of the frequently more suggested factors, that of acid stimulation of reverse peristalsis, would appear to be unlikely as Irons' (Irons & Lipin, 1955) case followed a truncal vagotomy, and in the patient described by Early (1957) a test meal carried out 2 weeks post-operatively (for relief of intussusception) showed achlorhydria. Further if gastric acid is an important factor then a high association of anastomotic ulcer would be expected but this has only occurred twice. This study further emphasizes the absence of a common factor, and throws no new light on the etiology of this type of intussusception.

Treatment. In the chronic case with the diagnosis established, an attempt should be made to relieve symptoms conservatively; persistent symptoms may need surgery, e.g. a gastroenterostomy will benefit from revision to a Bilroth I gastrectomy. In the acute case the treatment is surgical; in the first instance simple reduction, if it can be effected, is all that is required. It is probable that the adhesions following such an episode effectively fix the efferent loop and no other measures, e.g. plication of the mesentery (Tuschka, 1963), suture of afferent and efferent limbs together (Jääskeläinen, 1954) or suture of efferent limb to anterior abdominal wall (Swartz, 1929) are required. Recurrence has been reported following simple reduction or reduction and fixation (Burdman, 1954; Douglas, 1954) but is rare and usually required surgical revision of the initial operation.

Acknowledgment

I should like to thank Dr T. Pilkington for his permission and encouragement in the preparation of this report.

References

AVAKOFF, J.C. & SMITH, P.D. (1965) Jejunogastric intussusception. *Pacif. Med. Surg.* 73, 337.

- BOZZI, E. (1914) Su di una rara complicanza consecutiva a gastroenterostomia allo v. Hacker. *Boll. Accad. med. (Genova)*, 3-4, 122.
- BURDMAN, M. (1954) Case of thrice occurring retrograde intussusception of efferent loop of jejunum through the stoma with theory as to aetiology. *Postgrad. med. J.* 30, 200.
- COATES, D.M. (1949) Jejunogastric intussusception. *Brit. J. Radiol.* 22, 544.
- DAVEY, W.W. (1954) Retrograde intussusception following Roux loop anastomosis in total gastrectomy. *Brit. J. Surg.* 42, 102.
- DEVOR, D. & PASSARO, E. (1966) Jejunogastric intussusception, review of four cases—diagnosis and management. *Ann. Surg.* 163, 93.
- DOUGLAS, W.K. (1954) Recurrent retrograde gastrojejunal intussusception. *Postgrad. med. J.* 30, 204.
- EARLY, P.F. (1957) Jejunogastric intussusception. *Postgrad. med. J.* 33, 193.
- FREDERICK, P.L. & SIZER, J.S. (1965) Antegrade jejuno-jejunal intussusception, a rare complication following total gastric resection. *Ann. Surg.* 161, 597.
- FREEMAN, F.J., BERNATZ, P.E. & BROWN, P.W. (1966) Retrograde intussusception after total gastrectomy. Report of a case. *Arch. Surg. (Chic.)*, 93, 586.
- GRIMES, A.E. (1949) Retrograde intra-gastric intussusception of jejunum following subtotal gastrectomy, case apparently second such in literature. *Ann. Surg.* 129, 404.
- IRONS, H.S., JR & LIPIN, R.J. (1955) Jejunogastric intussusception following gastroenterostomy and vagotomy. *Ann. Surg.* 141, 541.
- JÄÄSKELÄINEN, V. (1954) Retrograde intussusception after certain gastric operations. *Ann. Chir. Gynaec. Fenn.* 43, 129.
- JACKMAN, M. & MIDDLEMISS, J.H. (1961) Retrograde jejuno-gastric intussusception. A review of ten cases diagnosed radiologically. *Brit. J. Surg.* 49, 260.
- LAVADIA, P., JR, HAYNES, B.W., JR & DE BAKEY, M.E. (1953) Retrograde jejuno-gastric intussusception. Review of literature and case report occurring after partial gastrectomy. *Amer. Surg.* 19, 507.
- MASON, L.B., WILLIAMS, R.W. & MARSHBURN, E.J. (1960) Retrograde jejuno-gastric intussusception following gastrectomy. *Arch. Surg. (Chic.)*, 81, 485.
- MCMANARA, W.L. (1944) Retrograde jejuno-gastric intussusception through subtotal gastrectomy stoma. *Ann. Surg.* 120, 207.
- RASTOGI, H., ALFIDI, R.J., HERMAN, R.E. & BROWN, C.H. (1968) Retrograde jejuno-gastric intussusception. Review of the literature and a report of a case. *Cleveland Clin. Quart.* 35, 33.
- REVELT, W.P., JR & ANDERSON, A.A. (1964) Retrograde jejuno-gastric intussusception. *Surg. Gynec. Obstet.* 119, 1305.
- ROBERTSON, D.S. & WEDER, C.H. (1968) Acute jejuno-gastric intussusception. *Can. J. Surg.* 11, 210.
- SHACKMAN, R. (1940) Jejunogastric intussusception. *Brit. J. Surg.* 27, 475.
- SOTEROPOULOS, C., BERKMAN, Y. & GILMORE, J.H. (1959) Jejunogastric intussusception. *Radiology*, 73, 238.
- STEBER, VON (1917) Ueber einen seltenen Fall von Invagination-Ileus. *Muench. med. Wschr.* 64, 648.
- SWARTZ, D. (1929) An unusual case of intussusception. *Can. med. Ass. J.* 20, 172.
- TUSCHKA, O. (1963) Jejunogastric intussusception. *J. Amer. med. Ass.* 186, 1092.
- VIRTAMA, P. & JANKALA, E. (1961) Intermittent jejuno-gastric intussusception after subtotal gastrectomy. *Brit. J. Radiol.* 34, 750.
- WÖLFLE, A. (1881) Gastro-Enterostomie. *Zentbl. Chir.* 8, 705.