

immunity in neonates was impaired. Our experience strongly suggested that the technique of vaccination was the important factor, which was why experienced tuberculosis health visitors performed all the vaccinations. The Dermo-jet overcomes the difficulty of giving intradermal injections in neonates but should be used by experienced operators who can immediately detect whether it is functioning incorrectly.

The variable results, if not related to technique, could be due to a racial factor or to other factors in early childhood; our results, however, showed that cell mediated immunity in neonates is sufficient to allow them to become sensitive to tuberculin after BCG vaccination. This is supported by retrospective data from Manchester showing 75% protection from neonatal BCG,<sup>5</sup> a figure similar to that found in adolescents.

- 1 Department of Health and Social Security. *The school BCG vaccination programme*. London: DHSS, 1985. (DA (85) 27.)
- 2 Rosenthal SR, Loewinson E, Graham ML, Liveright D, Thorne MG, Johnson V. BCG vaccination against tuberculosis in Chicago. A twenty year study statistically analysed. *Pediatrics* 1961;28:622-41.
- 3 Grindulis H, Bavnham MDI, Scott PH, Thompson RA, Wharton BA. Tuberculin response two years after BCG vaccination at birth. *Arch Dis Child* 1984;59:614-9.
- 4 Chamberlayne EC, ed. *Status of immunisation in tuberculosis in 1971*. Bethesda: National Institutes of Health, 1971. (DHEW publication No (NIH) 72-68.)
- 5 Curtis HM, Leck I, Bamford FN. Incidence of childhood tuberculosis after neonatal BCG vaccination. *Lancet* 1984;i:145-8.

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## Intestinal pseudo-obstruction: a new complication of oesophageal sclerotherapy

Endoscopic sclerotherapy of oesophageal varices is now established as an effective means of preventing recurrent bleeding from the varices. We report three cases of a previously undescribed complication of sclerotherapy.

### Case reports

*Case 1*—A 77 year old woman with cryptogenic cirrhosis presented with haematemesis and melaena. On endoscopy large oesophageal varices were found. Four days after admission sclerotherapy with 5 ml ethanolamine oleate was undertaken. Four days later her abdomen was noted to be distended with scanty tinkling bowel sounds. Abdominal x ray films showed distended bowel with fluid levels; this resolved spontaneously in 48 hours. After one week repeat injections with a total of 12.5 ml sclerosant were followed in 48 hours by a recurrence of these clinical features. The symptoms and signs resolved; sigmoidoscopy and barium enema performed after this episode yielded normal results.

*Case 2*—A 59 year old man presented with anorexia, weight loss, weakness, and a 24 hour history of melaena. Gastroscopy showed oesophageal varices with fresh

blood in the stomach. Seven days later sclerotherapy was performed with three injections of ethanolamine totalling 14 ml. After 48 hours distension of the abdomen with tinkling bowel sounds was noted. Abdominal x ray films showed dilatation of both large and small bowels, which persisted for 48 hours before resolving spontaneously. Sclerotherapy one week later was again followed by this problem, which resolved slowly over 10 days. Barium enema five days later showed only multiple diverticula of the sigmoid colon.

*Case 3*—A 48 year old man with alcoholic micronodular cirrhosis presented with massive haematemesis. Endoscopy showed large oesophageal varices with no evidence of active bleeding. Five days later these were treated with three injections of sclerosant totalling 14 ml, which were followed by some bleeding not requiring transfusion. Within six hours of the procedure his abdomen became distended and hyper-resonant with scanty bowel sounds. X ray films showed distended proximal small bowel and a dilated viscus filled with gas in the right iliac fossa. His symptoms resolved in 48 hours after insertion of a nasogastric tube. He underwent two further treatments, one week apart, uneventfully. Sclerotherapy on a fourth occasion, however, was followed in six to eight hours by colicky abdominal pain and local tenderness and by scanty tinkling bowel sounds the next day. Abdominal x ray films showed only increased bowel gas. Subacute intestinal obstruction was diagnosed and laparotomy performed. This showed cirrhotic liver but no cause of intestinal obstruction. He made an uneventful postoperative recovery.

### Comment

Sclerotherapy was performed using the technique described by Clark *et al* with an Olympus GIFQ endoscope Williams overtube.<sup>1</sup> Ethanolamine oleate is injected to a maximum of 20 ml sclerosant intravariceally. These cases all showed a clinical picture closely simulating that of intestinal obstruction. In all the white cell count, temperature, serum potassium concentration, and amylase activity were unchanged at the time that these features developed. No patient received drugs affecting gastrointestinal motility at this time. Two patients underwent subsequent endoscopy without sclerotherapy with no recurrence of abdominal distension (cases 1 and 2), suggesting that this phenomenon was related to the injections themselves.

No mechanical or biochemical cause of intestinal obstruction was found, suggesting a functional aetiology. One explanation of this might be interference with nerve conduction. Evidence suggests that sclerotherapy results in transmural inflammation and perioesophageal damage to vagal trunks. This damage combined with air insufflation might lead to the clinical picture observed. Dilatation of the stomach with air after sclerotherapy has been reported.<sup>2</sup> An alternative explanation might be dysfunction of retroperitoneal autonomic ganglia caused by tracking of the sclerosant through the diaphragm into the retroperitoneal space. This might produce dysfunction in distal areas of gut with relatively normal proximal bowel, simulating an obstruction.

- 1 Clark AW, Westaby D, Silk DBA, *et al*. Prospective controlled trial of injection sclerotherapy in patients with cirrhosis and recent variceal haemorrhage. *Lancet* 1980;ii:552-4.
- 2 Crawford DC, Ryan DW. Acute respiratory insufficiency after endoscopy for bleeding oesophageal varices. *Br Med J* 1984;288:1639-40.

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