(Byrom, 1933). The reasons for abdominal localization of the fluid are not clear. The fluid of myxoedema ascites is characteristically straw-coloured and has the properties of an exudate with a protein concentration of 40–60 g/l and an electrophoretic pattern similar to that of serum (Taipole and Hokkanen, 1956). This may be helpful in the differential diagnosis in patients with cirrhosis and congestive cardiac failure where the protein content of the ascitic fluid is low and the fluid has the characteristic of a transudate.

Other workers (Paddock, 1950; Pathy, 1955) have shown a diuresis beginning at about 2 weeks after the initiation of L-thyroxine therapy. The initial response to L-thyroxine was disappointingly slow in the present case. Full thyroid replacement therapy had, however, not been attained in the patient at the stage when complete resolution of the ascites occurred.

Myxoedema ascites is rare, and its onset may be insidious, but when it occurs it is usually massive and the diagnosis is often delayed. Myxoedema should always be considered in the differential diagnosis of ascites since it is one of the few diseases for which treatment is simple and curative and the need for repeated paracentesis is thereby avoided.

Acknowledgments

We wish to thank Dr K. Ball and Dr L. Blendis for allowing us to report details of a patient under their care.

References

- BYROM, F.B. (1933) The nature of myxoedema. *Clinical Science*, **1**, 273.
- KOCHEN, R.S. & ATKINSON, M. (1963) Ascites in hypothyroidism. *Lancet*, **i**, 527.
- LEICHTY, R.D., MILLER, R.F. & COHEN, W.N. (1970) Myxoedema causing adynamic ileus, serous effusions and inappropriate secretion of anti-diuretic hormone. *Surgical Clinics of North America*, **50** (5), 1087.
- MCGAVACK, T.H. & SCHWIMMER, D. (1944) Problems in the treatment of cardiac failure in myxoedema. *Journal of Clinical Endocrinology*, **4**, 427.
- MARZULLO, E.R. & FRANCO, S. (1939) Myxoedema with multiple serous effusions and cardiac involvement (myxoedema heart). *American Heart Journal*, **17**, 369.
- PADDOCK, F.K. (1950) Massive ascites due to myxoedema. *New England Journal of Medicine*, **242**, 822.
- PATHY, M.S. (1955) A case of myxoedema with serous effusions. *British Medical Journal*, **2**, 772.
- SACHDEV, Y. & HALL, R. (1975) Effusions into body cavities in hypothyroidism. *Lancet*, **i**, 564.
- TAIPOLE, E. & HOKKANEN, E. (1956) The muco-protein levels of the ascitic and pleural fluids and their clinical significance. *Acta medica Scandinavica*, **55**, 113.
- WASKILEWSKA, J. & KOMAINICKA, R. (1974) A case of hypothyroidism with concomitant ascites. *Przegląd Lekarski (Krakow)*, **38** (8), 766.

Postgraduate Medical Journal (June 1977) **53**, 344–346.

Free perforation of the small bowel in Crohn's disease

RODNEY J. CROFT
M.A., M.B., F.R.C.S.

Central Middlesex Hospital

Summary

A rare case of free double ileal perforation in previously asymptomatic and undiagnosed Crohn's disease of the terminal ileum is described. At operation, a primary resection and anastomosis of the diseased bowel was performed. The management of free perforation in Crohn's disease is discussed, together with a review of the literature. It is suggested that the absence of steroids in a previously undiagnosed case may favour primary resection and anastomosis.

Introduction

The first case of free perforation in ileitis was

Correspondence: Mr Rodney J. Croft, Senior Surgical Registrar, The Middlesex Hospital, Mortimer Street, London W1.

recorded by Arnheim (1935), and since then, more than 100 cases of this complication have been recorded (Menguy, 1972), and the incidence is estimated to be 1–2% (Steinberg, Trevor-Cooke and Alexander-Williams, 1973).

Most authors agree that primary resection of the diseased segment is the surgical treatment of choice, but in view of the peritoneal contamination, controversy exists regarding the timing of the anastomosis. Primary anastomosis is favoured by Waye and Lithgow (1967), and Graham and Baugh (1968), but Menguy (1972) favours an initial double-barrelled ileocolostomy with subsequent elective closure. The author's experience with a recent case has raised further points regarding this controversy.

FIG. 1. Showing the two perforations in the terminal ileum, 7 and 8.5 cm from ileo-caecal valve.

Case report

A 44-year-old woman was admitted as an emergency with a 1-week history of generalized intermittent colicky abdominal pain associated with vomiting, and constipation for the past 4 days. Forty-eight hours before admission the pain had become very severe in the right iliac fossa. She gave a history of 12 kg loss in weight occurring over a number of years. Four years previously she had an IUCD fitted and had subsequently suffered from dysmenorrhoea and menorrhagia. There was no other relevant past history.

On examination, she was pale, temperature 36.5°C, pulse 120/min, BP 130/70. Abdominal examination revealed signs of generalized peritonitis. Tenderness was elicited bilaterally on rectal examination. An initial diagnosis of perforated appendicitis was made. Investigations: Hb. 10.4 g/dl; WBC $6 \times 10^9/l$. Electrolytes and urea normal. Plain abdominal X-rays normal.

At operation, turbid fluid was found in the peritoneal cavity. The appendix was normal. The terminal 32 cm of ileum showed typical features of chronic Crohn's disease, but without adhesions to other loops of bowel or abscess formation. On the antimesenteric border of the ileum, two free perforations were found 7 and 8.5 cm, respectively, from the ileo-caecal valve (Fig. 1). The remainder of the small bowel and the large bowel was normal.

Primary resection of the terminal 42 cm of ileum, caecum and proximal 10 cm of ascending colon was performed with end-to-end anastomosis. Postoperatively, the patient made a satisfactory recovery apart from a mild wound infection. She remains well with no further evidence of Crohn's disease (19 months postoperatively).

Examination of the resected specimen revealed the two perforations to be 2 and 3.5 cm proximal to an area of marked luminal narrowing. The terminal 23 cm of ileum showed severe Crohn's disease; the most proximal 10 cm appeared normal. Histology showed typical features of active Crohn's disease with fissuring, mucosal ulceration, granulomata and transmural inflammation consisting of lymphoid aggregates in all layers of bowel wall. In addition, there was marked acute inflammation of all layers with many polymorphs in the muscularis externa, serosa and mesentery.

Discussion

The patient gave no history suggestive of Crohn's disease. This concurs with the findings of Waye and Lithgow (1967) who reported that most patients present with an acute illness without antecedent symptoms. There was no free gas on plain abdominal X-ray of this case and this also accords with the majority of reports (Waye and Lithgow, 1967). Although the pathology usually reveals active on chronic disease (Steinberg *et al.*, 1973), perforation has been reported in acute ileitis (Nasr *et al.*, 1969). The commonest site of perforation is the ileum (Nasr *et al.*, 1969), but perforations have been described in the jejunum (Homb, 1946), Meckel's diverticulum (Horn and Rhoads, 1944), caecum (Midgley, Thompson and Arbor, 1968), and colon, Javett and Brooke, 1970). These perforations have been single or not identified and only four cases of multiple ileal (Harjola, Appelqvist and Lilius, 1965; Crohn, 1965; Nasr *et al.*, 1969; Menguy, 1972), and one multiple jejunal perforation (Harjola *et al.*, 1965), can be found in the literature. Perforation appears most commonly to occur proximal to

luminal narrowing (Waye and Lithgow, 1967; Robinson and Craft, 1967; Steinberg *et al.*, 1973), as was the case in the present patient.

The results of merely overseeing the perforation carry a high mortality (Menguy, 1972). In view of the importance of distal obstruction in the causation of perforation, primary resection of the diseased segment is fundamental in the surgical management, but the timing of re-establishing intestinal continuity is debatable. The danger of primary anastomosis in the presence of peritonitis is anastomotic leakage, especially if the patient is receiving steroids and the limits of resection are not disease free.

Steroids are not considered an important aetiological factor in the causation of perforation in Crohn's disease (Nasr *et al.*, 1969; Steinberg *et al.*, 1973), but the high incidence of anastomotic leakage following elective surgery for Crohn's disease has been attributed to steroids (Menguy, 1972).

Primary resection with a double-barrelled ileocolostomy (Menguy, 1972) invariably gives rise to stomal problems and requires subsequent surgical closure which too is not without complication. As the disease in the present patient was localized and she was not receiving steroids, a primary resection and anastomosis was considered the procedure of choice, and proved successful.

In free perforation without gross peritoneal contamination, the absence of steroids in a previously undiagnosed case of Crohn's disease may favour primary resection and anastomosis. The presence of steroids in a known case of Crohn's disease may favour primary resection and temporary ileocolostomy, especially if peritonitis is severe.

Acknowledgments

I am grateful to Mr J. F. Newcombe for permission to publish details of the case and also to Dr D. Lovell for the histological report.

References

- ARNHEIM, E.E. (1935) Regional ileitis with perforation, abscess and peritonitis. *Journal of Mount Sinai Hospital*, **2**, 61.
- CROHN, B.B. (1965) The pathology of acute regional enteritis. *American Journal of Digestive Diseases*, **10**, 565.
- GRAHAM, P.A. & BAUGH, J.H. (1968) Perforation and peritonitis in regional enteritis. *American Journal of Surgery*, **115**, 856.
- HARJOLA, P.T., APPLEQVIST, R. & LILIUS, H.G. (1965) Small bowel perforation in Crohn's disease. *Acta chirurgica scandinavica*, **130**, 143.
- HOMB, A. (1946) On acute regional enteritis. *Acta chirurgica scandinavica*, **94**, 343.
- HORN, R.C., Jr & RHODES, J.E. (1944) Regional enteritis involving Meckel's diverticulum. Perforation of the diverticulum and fistula formation. *Annals of Surgery*, **119**, 274.
- JAVETT, S.L. & BROOKE, B.N. (1970) Acute dilatation of colon in Crohn's disease. *Lancet*, **ii**, 126.
- MENGUY, R. (1972) Surgical management of free perforation of the small intestine complicating regional enteritis. *Annals of Surgery*, **175**, 178.
- MIDGLEY, F.M., THOMPSON, N.W. & ARBOR, A. (1968) Free bowel perforation with regional enteritis. *Archives of Surgery*, **97**, 553.
- NASR, K., MOROWITZ, D.A., ANDERSON, J.G.D. & KIRSNER, J.B. (1969) Free perforation in regional enteritis. *Gut*, **10**, 206.
- ROBINSON, K.P. & CRAFT, I.L. (1967) Free perforation of the small bowel due to regional enteritis. *British Journal of Surgery*, **54**, 799.
- STEINBERG, D.M., TREVOR-COOKE, W. & ALEXANDER-WILLIAMS, J. (1973) Free perforation in Crohn's disease. *Gut*, **14**, 187.
- WAYE, J.D. & LITHGOW, C. (1967) Small bowel perforation in regional enteritis. *Gastroenterology*, **53**, 625.