DUPLICATION OF THE VERMIFORM APPENDIX

G. MAIZELS, B.Sc., M.B., CH.B., F.R.C.O.G., *Port Elizabeth*

One of the extremes of variation to which the appendix is subject is duplication, of which 40 cases have been recorded. At the other extreme is congenital absence of the appendix, of which there are over 70 known cases, and which should be diagnosed only in an unscarred abdomen.

In his review of the comparative anatomy of appendix duplex, Cave[1] states that cases fall into 2 categories: (*a*) Supernumerary appendix due to persistence of a transient embryological structure of great morphological interest; and (*b*) appendicular duplicity incidental to a more general affection of the primitive mid-gut. Descriptively there are 3 main types:

Type A. Single caecum with one appendix exhibiting partial duplicity.

Type B. Single caecum with 2 obviously separate appendices.

Type C. Duplicity of the caecum, each caecum bearing its own appendix.

Type C, the least common, is associated with duplication of the colon and with multiple abnormalities incompatible with life. In type A, the commonest type, partial duplication can manifest itself in numerous ways.

Type B is the one of chief clinical interest to the surgeon. It includes the 'bird-type' of duplication, consisting of 2 appendices, symmetrically placed on either side of the ileocaecal valve. Waugh[2] describes a 'taenia coli' type, where one appendix arises at the normal site and the smaller (or rudimentary) appendix arises along the lines of one of the taeniae.

Duplication of the appendix is not often encountered in adults, in whom it is usually discovered during an operation for acute appendicitis. Most specimens have been obtained from newborn infants, often stillborn, and from young children.[3]

The case that is now recorded is one of the more unusual varieties of partial duplication; namely bifurcation of the appendix.

CASE REPORT

Mrs. J. S., aged 35, was being investigated for infertility. Her only pregnancy had ended in a septic abortion in 1961, otherwise there was nothing of note in her previous history.

Her only other complaint was occasional pain in the right iliac fossa.

On physical examination, the patient was overweight at 210 lb., but active and healthy. The only abnormality discovered was a very tender cystic right ovary. After a series of investigations with negative results had been completed, she was advised to have a diagnostic curettage and partial resection of the right ovary.

On 25 November 1965, under general anaesthesia, the presence of the cystic ovary was confirmed and the diagnostic curettage showed the absence of normal endometrium. Laparotomy was then performed and the appendix was seen to be bound down by dense adhesions to the fundus of the uterus just posterior to the right cornu. As the uterus was lying in a deep pelvis, the appendix was fully stretched out and tense. In order to mobilize the uterus, the appendix was clamped and divided 1 cm. from its very adherent tip. The uterus, fallopian tubes and left ovary were normal, but there was a haemorrhagic luteal cyst in the right ovary, which was resected. The tip of the appendix was then removed together with a small portion of the adherent surrounding tissues.

Fig. 1. Bifurcation of the appendix.

The rest of the appendix was then fully exposed and only then was it seen to be the shorter limb of a bifurcated or inverted Y-shaped appendix (Fig. 1). Both limbs branched off from a short common trunk, which arose from the caecum at the normal appendicular site. The longer limb, which was the appendix proper, was lying well back in the pelvic cavity and was obscured by bowel and fat; its appearance was that of a normal appendix with no signs of previous inflammation. The shorter limb or supernumerary appendix arose antero-laterally from the left side of the common trunk and had a small mesentery of its own; it was supplied by a branch of the appendicular artery. Appendicectomy was then performed. No Meckel's diverticulum or any other congenital abnormality was found in the abdomen.

Description of Specimen

The common trunk was 2·0 cm. in length and 9 mm. in diameter. The longer limb or appendix proper measured 7·0 cm. in length from the point of bifurcation and its diameter varied from 7 to 9 mm. The shorter limb measured 2·5 cm. in length from the point of bifurcation, just beyond which its diameter was 5 mm., but at the expanded tip it was 8 mm. The common trunk had only one lumen, which was in direct continuity with that of the longer limb. The shorter limb was constricted at its origin, but then expanded to the average diameter for the next 0·75 cm., followed by a narrow segment 0·5 cm. long, finally leading to the bulbous tip. A cross-section of the shorter limb taken at 1·5 cm. from the tip shows typical appendix histology (Fig. 2).

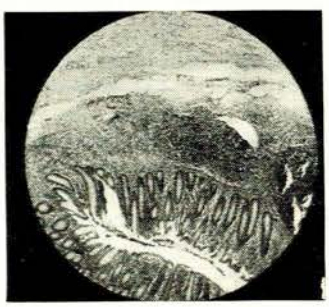

Fig. 2. Section through supernumerary appendix.

DISCUSSION

Kelly and Hurdon[4] observed a temporary outgrowth from the apex of the caecum in a 6-week-old embryo. This was confirmed by Gladstone and Wakeley,[5] who suggested that this was a completely independent structure, which normally disappears before the permanent appendix is differentiated. If it does not disappear, it may well be the explanation of 2 appendices arising from a single caecum. Partial fusion of this temporary outgrowth with the appendix proper may also account for partial duplication. The simplest example of this type is the 'double-barrelled' appendix, in which the single organ presents 2 distinct lumina throughout its entire length, as in Rosenberger's case,[6] or through only a part thereof, as in Walthard's case.[7]

Elwyn[8] described a 2-limbed appendix that fused distally. Somewhat similar is Watt's[9] specimen, which also arose from a bifid stem, the larger of the 2 channels arising from the normal site and the smaller from the postero-lateral aspect of the caecum. Clavel and Colson's[10] appendix with a bifid tip illustrates another variety of partial duplication, an inverted Y-shaped bifurcation of the appendix.

Our own specimen, which is a well-developed example of the last variation, is of interest on account of the adherence of the tip of the supernumerary appendix to the fundus of the uterus. It undoubtedly had been the site of a severe localized infection, which had not spread to the appendix proper. It is suggested that during the one and only pregnancy that had ended in a septic abortion 4 years earlier, the enlarged gravid uterus had come into close contact with the tip of the shorter limb, which had then become involved in the septic process.

From the surgical aspect an appendix exhibiting partial duplication is unlikely to present a problem, but when 2 separate appendices arise from 1 caecum, one of them may well be overlooked and may subsequently give rise to unwelcome litigation. In the case of Tudor v. Mein[11] appendicectomy had been performed twice in 5 months on a child, on each occasion by a competent surgeon and at each operation the appendix had been witnessed by trained observers. The first appendix was 3½ in. (8·75 cm.) in length and the second appendix 4½ in. (11·25 cm.). A pathologist testified that the tip of the second appendix was its original tip, and not a stump after partial removal. Although the summarized report of the action did not specifically mention the possible diagnosis of a double appendix, which, in view of its rarity, is not surprising, yet from the evidence submitted such a diagnosis would be difficult to refute. This too was the opinion of Prof. O. Margarucci of Rome, who, as reported by Green,[12] had also operated on a gangrenous appendix and had removed at the same time a totally separate healthy appendix, complete in itself, and arising from the caecum.

The presence of a supernumerary appendix could be obscured by an appendicular abscess, and a small grid-iron incision might also in certain circumstances limit one's inspection of the caecum.

SUMMARY

A case of partial duplication of the appendix, discovered during a gynaecological operation, is described. An unusual complication was the adhesion of the supernumerary appendix to the uterus. The presence of a completely separate, second appendix may be overlooked, unless the caecum is carefully examined.

REFERENCES

1. Cave, A. J. E. (1935 - 36): J. Anat., **70**, 283.
2. Waugh, T. R. (1941): Arch. Surg., **42**, 311.
3. Watt, J. K. (1958 - 59): Brit. J. Surg., **46**, 472.
4. Kelly, H. A. and Hurdon, E. (1905): *The Vermiform Appendix and Its Diseases*, p. 56. Philadelphia: W. B. Saunders & Co.

5. Gladstone, R. J. and Wakeley, C. P. G. (1924): Brit. J. Surg., **11**, 503.
6. Rosenberger, R. C. (1903): Proc. Path. Soc. Philad., **24**, 206.
7. Walthard, B. (1931): Dtsch. Z. Chir., **230**, 413.
8. Elwyn, A. (1924): Anat. Rec., **27**, 180.
9. Watt, J. K. (1958 - 59): *Op. cit.*[3]
10. Clavel, C. and Colson, P. (1933): Lyon chir., **30**, 174.
11. Medico-Legal (1932): Brit. Med. J., **1**, 504.
12. Green, P. (1932): Lancet, **2**, 210.