Operative treatment is desirable, as appendicitis can then be excluded, or it may be found to be superimposed on mesenteric adenitis in association with ascariasis, particularly as worms may initiate inflammation by ulceration of the mucosa, obstruct the lumen of the organ, or cause the appendix to be involved in the lymphoid hyperplasia (see above). Therefore, until some more specific means for detecting hyperinfestation is available the wisest course appears to be to perform laparotomy, remove the appendix, and follow this with specific anthelmintic therapy.

While it is possible that mesenteric adenitis is part of an allergic response to hyperinfestation, or is due to infection secondary to mucosal damage by the worms, there is at present insufficient evidence to substantiate these views. The clinical examples, however, show that there is a definite association between the two conditions.

Summary

The surgical complications of infestation with roundworms include intestinal obstruction, perforation, and peritonitis. The available literature makes no mention of an association between ascariasis and mesenteric adenitis. Five cases in which mesenteric adenitis was associated with hyperinfestation with roundworms are described; in only one of these was the correct diagnosis made before operation. The clinical features, the operative and histological findings, and the treatment of this clinical entity are discussed. Until a specific test is available for the detection of hyperinfestation, laparotomy and appendectomy are recommended, followed by specific anthelmintic therapy.

ADDENDUM.—Since this article was presented for publication two further cases have been encountered: it was possible to diagnose them correctly before operation, and they ran a similar clinical course.

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After the official opening of the Eleventh International Hospital Congress, the inaugural address on the main theme "Efficiency Methods in the Hospital" was given by Dr. T. E. Chester, professor of social administration at Manchester University. He considered that the present interest in efficiency methods was not merely a passing phase, but was becoming a fundamental and essential part of the new equipment of hospitals. The universal steep rise in running costs and the shortages of staff, caused by increased specialization and the change in the social climate in which the hospital has to operate, are but one reason for the need for efficiency methods. Another is the fact that capital expenditure has also risen. . . . The third trend which Dr. Chester distinguished was the increase in the demand for hospital services, coupled with a change in demand. The hospital is no longer a place for poor people in which to die; it has become one of the first essentials of a civilized community. (International Hospital Federation, *News Bulletin*, June, 1959.)

MESENTERIC CYSTS WITH MALROTATED INTESTINE

BY

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Developmental mesenteric cysts are rare. It appears to be more than a coincidence that in four children with this anomaly malrotation of the intestines was also present. The association of these two conditions was first described by Hunter (1922). Subsequent reports have been made by Sala and Nachamie (1929), by Goldberg *et al.* (1940), by Mendillo *et al.* (1952), and by Kron and Satinsky (1954). We have been stimulated to seek for a common factor in their aetiology.

Case 1

A girl aged 6 years was admitted to hospital under the care of Mr. Charles Donald. Intermittent abdominal pain and vomiting started when she was 18 months old, and she vomited once weekly until the age of 4. For the next two years she vomited once a month and the vomitus was always green. Her appetite was poor and her stools had recently become a pale yellow colour.

On examination a smooth, round, mobile cystic swelling 7 cm. in diameter was palpable in the right lower abdomen. The cyst could be freely pushed into the right hypochondrium and into the left iliac fossa.

At laparotomy the cyst was found to be situated "in the wall" of the proximal jejunum, and the blood vessels on its surface were continuous with those encircling the gut. There was a volvulus of the cyst together with the associated jejunal loop, but in addition there was an incomplete rotation of the intestines. The duodeno-jejunal flexure was situated to the right of the midline, and from it a peritoneal band ran laterally across an abnormally high caecum. Division of this band liberated the duodeno-jejunal flexure and the caecum, permitting the display of a mesentery, universal for the small and large gut and having a 5-cm. fenestration at the ileo-caecal junction.

The cyst and the adjacent jejunum were resected, a side-to-side anastomosis restoring intestinal continuity. The mobilized caecum was placed in the left iliac fossa prior to wound closure. Recovery was uneventful and the patient was discharged on the twelfth post-operative day.

Dr. Martin Bodian reported on the excised specimen. "The specimen consists of small bowel 10 cm. in length of normal uniform calibre . . . on its mesenteric border is a spherical cyst 6 cm. in diameter containing almost clear, slightly mucoid yellowish-brown fluid. The smooth, thin fibrous wall of the cyst is covered by serosa and the lining is not loculated. Near the cyst's attachment to the bowel wall the lining is opaque and slightly thickened . . . with raised areas of yellow pigmentation. . . . Microscopy: the cyst wall is formed of collagenous tissue and the lining is a layer of flattened endothelial cells. These appearances are compatible with a diagnosis of mesenteric cyst."

Case 2

A girl aged 4 years presented as an emergency case with a severe attack of abdominal distension and vomiting and

was admitted under the care of Mr. Denis Browne. She had a history of previous similar attacks which were not so severe.

An urgent laparotomy was performed. The abdomen contained over 2 pints (1,140 ml.) of opalescent fluid. There was malrotation of the intestines with a volvulus of the ileum. The gut was mobilized and the volvulus was unwound. Recovery was uneventful and the child was discharged two weeks after operation.

She was subsequently readmitted after an interval of 15 months, having continued to have attacks of abdominal pain and bilious vomiting. A further laparotomy was performed. The lower ileum was found to be obstructed by an omental band and two mesenteric cysts. The compressed ileum was resected together with the cysts, and an end-to-end anastomosis restored the gut. The patient's convalescence was uneventful.

The excised specimen was a loop of ileum patent throughout, with a cyst protruding on each side of the mesentery. One measured 3.5 by 2.5 cm. by 2.5 cm., and the other 6 by 5 by 3 cm. Both cysts contained pale yellow albuminous partly clotted fluid. The cysts were lined with flat endothelium and their thin fibrous walls contained many dilated lymphatic spaces.

Case 3

A girl aged 6 years was admitted to hospital moribund under the care of Professor Moncrieff. She died within half an hour of reaching hospital. This child had a history of intermittent attacks of abdominal pain, vomiting, and constipation since the age of 2½ years. Vomiting was the main feature of the terminal attack, continuing repeatedly for three days prior to admission. Death was due to peripheral circulatory failure.

Necropsy (Dr. Martin Bodian).—The small intestine was found to have undergone a volvulus of two complete turns. The gut was incompletely rotated, with a universal mesentery, high caecum, and abnormal peritoneal bands crossing the duodenal loop. A mesenteric cyst 10 by 6 cm. was related to the lower jejunum. This cyst contained milky fluid, and its congested wall included many dilated lymphatics. Histological examination showed the wall of the cyst to be formed of fibrovascular tissue, lymphatic channels, and thin strands of smooth muscle.

Case 4

A male infant aged 2 days was admitted to hospital under the care of Mr. Charles Donald with a history of bilious vomiting beginning five hours after birth. Intestinal obstruction was diagnosed and exploratory laparotomy revealed chronic meconium peritonitis. The intestines were abnormally rotated in addition to being bound by fibrous adhesions. The transverse colon and mesocolon could not be found. A jejunal stenosis caused obstruction; this was by-passed by a side-to-side anastomosis. The infant survived two days.

Necropsy (Dr. Martin Bodian).—A little faecal matter oozed from the anastomosis, and the jejunum was friable, congested, and distended. The intestinal loops adhered and the mesenteric lymph nodes were haemorrhagic. 33 cm. proximal to the ileo-caecal valve there was an abrupt and extreme stenosis, and distal to this point there was a fenestrated mesentery and a mesenteric cyst which contained a little yellowish-brown fluid. This cyst was gangrenous and unsuited to histological examination, but the adjacent tissue showed the appearances of chronic meconium peritonitis. The unexpanded transverse colon was found behind the stomach and there was no gastro-colic ligament.

Discussion

The incidence of mesenteric cysts has been estimated by Beahrs and Judd (1947) as seven cases in a million hospital admissions. When some of these rare lesions

are associated with malrotation of the gut the possibility of a common factor in the aetiology of the two conditions is suggested. A close study of the relevant literature revealed two complementary hypotheses to link these lesions, and to these we now add a third.

The standard description of the rotation of the gut is that of Frazer and Robbins (1915), the embryology of the anomalies being discussed by Dott (1923). It is at the tenth week of foetal life, during the second stage of rotation (which comprises the return of the mid-gut loop to the abdominal cavity), that most anomalies occur. Dott considers that these are due to variation of the size of the embryonic umbilical orifice, which is normally too narrow to permit the bulky hernial content to return *en masse*. Hunter (1922) suggested that if the hernial bulk was enlarged by a mesenteric cyst normal return and rotation would be impeded.

This hypothesis requires the cyst to be of a significant size by the tenth week of foetal life, and this possibility is confirmed by the work of Lewis and Thyng (1908). They observed a cyst in the duodenal mesentery of a 20-mm. embryo pig, equal in diameter to the lumen of the gut. It appeared to arise by sequestration from an intestinal diverticulum, and their extensive study of the comparative embryology in the pig, rabbit, and man led them to conclude that similar diverticula were constantly present in the human embryo, commonly from the distal ileum, where many cysts are known to occur.

Mesenteric cysts can also develop in other ways. Their range, variety, and classification, have been the subject of many reviews such as those of Moynihan (1897) and Higgins and Lloyd (1924). The latter authors emphasize that true mesenteric cysts are not malignant, dermoid, or parasitic and do not arise in any normally placed retroperitoneal organ. These cysts have been found in the foetus and at every age to the eighth decade. Their diameter can vary from a few millimeters to a size that all but fills the abdomen, and their contents, irrespective of their nature, may include chyle or blood (Dowd, 1900). Mesodermal remnants, derived from the Wolffian body or from lymphatic or vascular tissue, account for most of these lesions that are not of intestinal origin. The latter group are to be clearly differentiated from duplications of the intestine both in structure and in aetiology, but as duplications arise in comparable situations in the sixth week of foetal life (Bremer, 1944) their mechanical effects on gut rotation may be similar.

A distinct group of mesenteric cysts of intestinal derivation is that associated with anterior spina bifida. Saunders (1943) reviewed this subject and observed that the cysts and adjacent bowel are tethered to the defective vertebral bodies by strands of connective tissue. This embryonic dorsal tethering of the gut (which can exist with an occult vertebral lesion and without cyst formation) can lead to malrotation. The vertebrae in our cases were not examined with this possibility in view. The fundamental anatomical lesion in the teratology of this anomaly is probably a sagittal split in the notochord with contact of the dorsal ectoderm with the yolk sac endoderm.

Foetal necrosis overtakes most of the relatively common small cystic formations in the mesentery of the embryo. We now suggest that occasionally this atrophy may cease and the cyst enlarge because of the recurrent disorganization of its lymphatic and venous drainage as a result of repeated volvulus of the mid-gut

loop. This form of volvulus is recognized as a frequent complication of intestinal malrotation.

Summary and Conclusions

The cases of four children are described in which that rare condition developmental mesenteric cyst was associated with malrotation of the intestines.

Mesenteric cysts often present clinically with intestinal obstruction resulting from volvulus. Whilst the volvulus is often confined to the intestines immediately adjacent to the cyst, it occasionally involves the mid-gut loop, and it is then associated with incomplete or aberrant rotation of the intestines. It is therefore prudent to examine the rotation of the gut when operating for mesenteric cysts. Conversely, the presence of mesenteric cysts should be excluded in patients with malrotated intestines, even when volvulus of the mid-gut loop is not apparent at laparotomy.

We thank Mr. Denis Brown, Professor Alan Moncrieff, Dr. Martin Bodian, and the late Mr. Charles Donald, of the Hospital for Sick Children, Great Ormond Street, London, for permission to report the cases, and Mr. H. H. Nixon and Mr. W. M. Dennison for their help and advice.

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Indians into this country, numerous congenital abnormalities are being first noted in adults, as their parents do not bother to seek advice so readily.

Case 1.—A sixteen-year-old London boy was referred by his doctor to the genito-urinary department complaining of having had pain in his right groin for three months. On examination he was found to have normal secondary sexual characteristics for his age, but had a left ectopic testicle lying at the root of his penis. He was later admitted to hospital, and at operation the testicle was dissected free from the pubis and successfully transferred into the scrotum.

Case 2.—A misplaced testis was found on routine examination of a 25-year-old Jamaican, who reported for treatment of acute gonorrhoea in the department of venereal diseases. His right testicle, which was fully developed, was found to be lying subcutaneously on the dorsal surface of his penis (see photograph). It could be easily pushed back up to the root of the penis, but not round to the sides.

Photograph of the misplaced testis of Case 2.

He stated that it caused him no inconvenience in its present position, as it retracted easily to the root of his penis, where it had lain in his younger days. He was referred to the genito-urinary department for opinion and advice, and, although advised to have an orchiopexy, he failed to report for operation.

I thank Mr. T. W. Mimpriss and Dr. C. S. Nicol for permission to report these cases, and for their encouragement and advice. I am also indebted to the photographic department of St. Thomas's Hospital for the photograph.

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Medical Memoranda

Two Cases of Pubopenile Testis

Ectopic testes may be found in various positions. Wakeley (1953), who reviewed the embryology of this condition, stated that among the least common positions are the perineal, the pubopenile, the femoral or crural, and the transverse.

In the Nosological Index of St. Thomas's Hospital, dating back to 1937, there are only three cases of uncommon ectopic testes, one being perineal and two, reported below, being pubopenile.

This pubopenile type is rare, only seven cases being recorded in the literature. Popow (1888) and Poupart (1897) reported the first two from France, followed by Bernhard (1925) and Kausch (1925), who each reported a case from Germany. Moynihan (1924) and Forsyth (1924) reported the only ones in this country from Leeds, and Kaufman (1943) recorded the first and only one from the U.S.A.

In most cases the patient is brought to the doctor when young because the parents notice one or both testes to be absent. With the influx of British West

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Riedel's Thyroiditis

In 1896 and 1897 Riedel described three cases of a peculiarly hard infiltrating lesion of the thyroid which was thought to be malignant both clinically and at operation, but histological examination and subsequent clinical course showed the disease to be a chronic inflammatory process. The condition is rare enough to warrant placing on record a case which conforms to the original description given by Riedel.

CASE REPORT

The patient was a woman aged 52. In 1951 she complained of a lump in the left side of her neck. There were no other subjective symptoms. Examination revealed a