The operation was well borne, and such good progress was made that I hoped the patient would soon be about again, but on June 23rd three motions containing a large quantity of blood were passed, and two days later another large escape of blood occurred by the bowel, the patient dying soon afterwards. Calcium chloride was administered freely before and after the operation, but it will be seen later that the bleeding was not such as this drug could reasonably be expected to control.

Necropsy.—The necropsy made by Mr. Billington showed the following conditions: The lower part of the liver, gall bladder, and right half of transverse colon were firmly adherent to the anterior abdominal wall around the wound. The liver, stomach, colon, spleen, and duodenum were involved in a dense mass of old adhesions which bound them to one another and to adjacent parts of the abdominal parietes. From caecum to rectum the bowel was distended with blood; the Murphy button lay free in the descending colon. The gall bladder opened by a wide orifice into the transverse colon just to the left of the hepatic flexure, the junction was firm and did not leak. There was extensive sloughing ulceration of the lower part of the gall bladder and this ulcer was the source of the bleeding, though no obvious bleeding point was visible, the ulcer was just above the opening into the colon. The gall bladder was a fair size but surrounded completely by adhesions, the cystic duct, the hepatic duct, and the common bile duct were all dilated. There was no stricture anywhere and there were no gall stones present; the opening of the common duct into the duodenum admitted a No. 4 catheter. The pancreas was generally very hard and dense, presenting evidence of old chronic interstitial pancreatitis. Microscopic sections showed numerous thick bands of organizing fibrous tissue forming a coarse irregular network in the meshes of which were the pancreatic alveoli, the appearance closely resembling that seen in multilobular cirrhosis of the liver; in places the pancreatic cells had undergone degenerative changes and had been replaced by fibrous tissue. The liver showed extensive changes; there was a considerable increase of fibrous tissue around the vessels and ducts in Glisson's capsule and the liver cells showed considerable fatty and granular change, very few normal ones being left.

The history and the necropsy show clearly, I think, that chronic inflammatory changes in the pancreas were responsible for the patient's troubles. There was in the first instance marked enlargement of the organ, and at the necropsy the main bile ducts were much dilated; they were free from calculi and stricture, and the opening of the common duct into the duodenum was quite patent. The only condition found which might have caused obstruction to the flow of bile, and with it of course pancreatic juice, into the bowel was the chronic inflammation in the pancreas met with at the first operation in 1897 and recognized by the pathologist at the necropsy, when it is probable that the process of contraction of the inflammatory tissue had considerably advanced and reduced the size of the enlargement originally felt.

In the paper containing the early notes of this case with others, I pointed out that the treatment required for chronic pancreatitis will not always be the same. Prolonged drainage of the gall bladder will in some cases suffice, but in others, of which Case 4 in my original paper and the one now under consideration are examples, further measures are required. If at the first operation in the case now completed the gall bladder had been united to the intestinal tract, there would have been none of the difficulties experienced later in effecting the union, and probably the patient would have been relieved of his suffering and rendered capable of pursuing his occupation.

REFERENCE.

- ¹ Remarks on Chronic Enlargement of the Pancreas in association with or producing Attacks simulating Biliary Colic.

AN ANALYSIS OF 110 OPERATIONS FOR STRANGULATED HERNIA.

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DURING my tenure of the appointment of Assistant Surgeon to the Manchester Royal Infirmary from 1889 to 1900 it fell to my lot to operate upon a very large proportion of the cases of strangulated hernia admitted to the hospital, and, as the experience thus gained is probably fairly representative of the conditions commonly met with in Lancashire, it has appeared to me worthy of record. For the collection of the very scanty notes of these cases I am much indebted to my recent house-surgeons, Messrs. Wharton and Lapage.

Within the years named the total number of cases in which I had to perform the operation of herniotomy is 110, and their

regional and sexual distribution is indicated in the following table:

			Males.	Females.	Total.
Inguinal	...	...	50	5	55
Femoral	...	...	3	34	37
Umbilical	...	...	4	13	17
Ventral	...	...	0	1	1
Total	...	...	57	53	110

The disproportion between the sexes in their susceptibility to strangulated inguinal and femoral hernia is here very marked, and is considerably greater than would be anticipated from the statistics of uncomplicated hernia. On the other hand the total number in each sex is almost equal, the male not showing the preponderant tendency to strangulation which might have been expected from the markedly greater frequency of hernia in this sex.

The case notes, which are often very defective, indicate the side which was affected in 53 cases of inguinal and femoral hernia. In 3 there was a double rupture, 2 being males with inguinal hernia on both sides, 1 (also a male) presenting a femoral on the right and an inguinal upon the left. In these 3 cases the right-sided rupture was alone strangulated. Of 48 remaining cases of single hernia with strangulation we have the following distribution: Right inguinal, 18; right femoral, 13; left inguinal, 12; left femoral, 7.

Strangulation thus appears to be more common on the right side in the proportion of 31 cases to 19, or about 3 to 2. Such a result was unexpected, and its explanation is not immediately obvious. To some extent it may perhaps be accounted for by the extra strain thrown upon the right side of the body, although it is difficult to appreciate how such strain could bear especially upon a right hernia. More probably the inequality is to be explained by the nature of the contents of the sac. Owing to its developmental position, and possibly to other causes, the omentum tends to enter a disproportionately large number of left herniae and the presence of omentum acts as a protection against strangulation by occupying the hernial canal with a yielding cushion, and thus allowing a greater amount of variation in the quantity of intestinal contents. Hence herniae of the left side may well be protected by their omentum from the danger of strangulation. The frequency of omental hernia upon the left side, and the tendency of strangulation to occur on the right are both well indicated in a table of Lockwood's: Of 79 strangulated inguinal and femoral herniae operated upon in St. Bartholomew's Hospital 49 were upon the right side, and of these 30 contained no omentum. On the other hand 30 were upon the left side, and 3 only were devoid of omentum.

The ages of the patients included in this analysis average 43.8 years, but considerable variations are naturally to be found in the case of different varieties of hernia. The 50 inguinal herniae of males include 8 children under 10 years of age, 6 cases only between the 10th and 30th year and 36 others extending up to the 84th year. The 5 females with inguinal hernia include 1 infant and 4 adults whose ages ranged from 37 to 54. The average age of all cases of strangulation in the inguinal region was 38.2 years. Femoral hernia, on the other hand, was found only in middle and late life, the extremes being 21 and 68 years while the average age was, for males 51.7 and for females 49.5. Among 17 strangulated umbilical herniae was 1 male infant of two days, the other cases ranging from 32 to 65 years of age and presenting an average of 50.3 years.

Strangulation being comparatively rare in infants and young children we may refer a little more fully to the exceptionally large number of examples here met with. One case of umbilical hernia was met with in a male infant aged 48 hours which was admitted with a very tense translucent sac about the size of a hen's egg: the sloughing stump of the umbilical cord was attached near the centre of the hernia: some meconium had been passed but there was constant vomiting. The infant was much exhausted and pressure would not replace the contents of the thin sac, which yielded no impulse on crying. The sac was entirely removed; its constricted neck divided, congested small intestine replaced in the abdomen and the operation wound closed by a single row of sutures: recovery was uninterrupted. Such a condition

appears to be sufficiently rare, as Macdonald collected only 31 cases of congenital umbilical herniae, of which 19 were treated by laparotomy with 2 deaths,² while Stern's analysis³ yields only 14 cases in a total of 1,900 herniotomies.

Nine cases of inguinal hernia were met with in children, of whom 8 were boys, the ages being 6 months, 8 months (2 cases), 13 months, 3 years, 5 years, and 9 years (3 cases). All of these infants and children recovered from the operation, which, in the case of one infant, included removal of the vermiform appendix. The rarity of strangulation in infants has been frequently noted, while the comparatively favourable results of operation were referred to by Howard Marsh as far back as 1874.⁴ About 150 such cases are collected by Stern.⁵ The average proportion among 1,900 operations performed in various hospitals being 1 infant to every 108 adults, while strangulation is more common in the first three than in the succeeding nine months of the first year, and is again much more common in the first than in the succeeding years of early childhood. The proportion of cases met with in my experience has thus been considerably above the average, and is increased by another infant aged 9 weeks (not included in our analysis) which died within a few hours of reduction by taxis.

The relative frequency of various forms of inguinal hernia is not well indicated by the imperfect notes in my possession, and only in 16 out of 55 cases have we any definite information. In ten of these cases the hernia is distinctly stated to have been "congenital," while in five others the early age of the patient renders it probable that the rupture was due to some form of patent processus vaginalis. In one case only the hernia is described as "direct." Writing from mere general recollection, and judging from the fact that in no single case do the notes speak of "ordinary," "acquired," or "oblique" hernia, I should, however, be disposed to conclude that all or nearly all of the 39 undescribed cases belong to the acquired oblique category, and that of the total number only 15 were congenital or funicular, and only 1 "direct." The undoubtedly "congenital" cases included men of 17, 23, 31, 33, 35, 38, and 46 years of age.

The duration of the hernia before strangulation is noted in 46 patients of over 10 years of age. Of these 36 had been ruptured for one or more years, 3 for periods of less than a year, and in 7 the appearance of the hernia was said to be coincident with that of strangulation. These figures perhaps represent fairly enough that the danger of strangulation in a quite recent hernia is great; that it much diminishes after the rupture is well established; and that it is again by far most common in old herniae. The tendency of quite recent herniae to strangulation is illustrated by a case admitted with an uncomplicated left inguinal hernia of twenty years' duration and a strangulated rupture on the right side which had been noted for twenty-four hours only. The figures further indicate, as might be anticipated, that femoral herniae are the most liable to early strangulation, and the umbilical form the least so; thus among the cases of over one year's duration we find 18 inguinal, 12 femoral, and 4 umbilical, whereas among the "recent" cases we have 3 inguinal, 6 femoral, and 1 umbilical.

It is most difficult to ascertain the duration of strangulation, as there is no one symptom from which the existence of that condition can be dated, while the expressions used in the notes such as "one day" and "two days" are obviously not precise. The point is, however, noted with more or less accuracy in 53 cases, of which 6 were fatal. In the fatal cases it is stated to have been 10 hours, 48 hours, and 2, 4, 7, and 8 days.

Among the 47 cases which recovered, we find 38 which may be regarded as "recent," the duration of strangulation not exceeding 4 days and averaging 36 hours, while 9 may be classed as of "old standing," their average duration being over 7 days, and in 2 of them there appeared to have been definite obstruction for periods of 10 and 14 days. Two of the cured cases had been reduced *en masse* before admission, and were dealt with by median laparotomy. These figures show no relationship between the duration of the strangulation and the recovery or death of the patient, but they are obviously of little value, and they are vitiated especially by the scanty information obtained from those who were admitted *in extremis*.

In the vast majority of cases no cause of strangulation was assigned. Five cases only give a history of any form of injury, 1 attributing the complication to a slip, 3 to severe strain in lifting weights, and 1 to "heavy spade work"; all

were adult males with old inguinal herniae, but in one—already referred to—it was not the old hernia, but a new rupture on the opposite side which became strangulated. Having regard to the strong inclination of patients to attribute all illness to injury, this absence of suggestion of any traumatic influence or even of exertion is striking, and has some medico-legal importance. In 1 case only cough appeared to have caused strangulation, this case being also an illustration of the dangers of very small herniae: a woman aged 50 developed a femoral rupture during violent coughing; reduction was effected and a truss was worn for a year without its reappearance; another vigorous attack of coughing then reproduced the hernia, which at once became strangulated.

The contents of the hernia included intestine in all cases, and no case of simple epiplocele was met with in those 110 operations; possibly, however, the less-marked urgency of such cases may have caused the resident staff to await the surgeons' visits in the morning rather than to send for an assistant surgeon, whose experience is, in Manchester, largely obtained in the evening and night. As to the relative frequency of pure enterocoeles and entero-epiploceles the notes give no indication. In 2 or 3 cases only does there appear to have been a partial epiplocele, or Richter's hernia, all of these being small femoral herniae of women, while the method of operation did not allow of such investigation as would prove that the entire lumen of the gut was not included in the stricture.

In a very large proportion of all the cases the intestine involved was naturally the small gut. In one right inguinal hernia in a child aged 8 months the vermiform appendix and a portion of the caecum were included in the sac, and in one adult male the entire caecum was present, with some ileum, the whole being gangrenous. Both of these cases presented complete sacs.

Caecal and appendicular hernia were met with less frequently than in cases of non-strangulated hernia operated upon for radical cure, and the condition of the transverse colon, as met with in umbilical hernia, indicates that, as a rule, sacs containing large intestine are less prone to strangulation, the greater mass of the gut requiring a large neck, and providing a yielding surface, which allows of some swelling, as does the protecting omentum already referred to.

In umbilical hernia the transverse colon was commonly met with in the sac, and in 2 such cases that intestine presented no signs of congestion, while strangulation had resulted from the pushing beneath it of a knuckle of the small intestine. One of these cases presents some special points of interest.

A woman aged 50 was admitted with a large umbilical hernia of 14 years' duration. On opening the sac its contents appeared to consist solely of uncongested omentum and transverse colon with extensive adhesions; on raising this there was revealed at the lower part of the neck of the sac a small knuckle of intensely-congested small intestine. The general condition of the patient being very bad, this knuckle only was reduced after slight section of the neck of the sac. Three years later the same woman returned with fresh strangulation but in much better general condition. Herniotomy revealed the same state of affairs, and a radical operation was now performed. In none of the other cases is strangulation known to have recurred.

Organs other than intestine and omentum were not met with in any of the cases, but one contained a "foreign body." The latter was almost spherical, about half an inch in diameter, and both externally and on section closely resembled a very hard-boiled egg; it consisted mainly of dense white fibrin with a central yellow nucleus, which was probably derived from a fragment of the very granular omentum also met with, and not from an appendix epiploicus.

The condition of the intestine varied within the widest limits but actual gangrene or perforation had occurred in 10 instances only. In all of the remaining 100 cases the gut was replaced within the abdomen, and there is no reason to suppose that subsequent perforation occurred in any of them. In one of these cases free haemorrhage from the bowel followed on the day after the operation. Death ensued, but no necropsy was obtained.

The mortality of herniotomy is variously estimated by different writers, and is given by Treves as "over 30 per cent." and by Rose and Carless as "about 35 per cent.," but my own cases yield a considerably lower figure, as do the statistics of several London hospitals. The actual results in our cases regionally classified are as follows:

	Cases.	Deaths.	Mortality per cent.
Inguinal	55	15	27.27
Femoral	37	8	21.62
Umbilical	17	3	17.64
Ventral	1	1	100.00
Total	110	27	24.54

In this table there can, however, be little doubt that from accidental causes the danger of the inguinal form is exaggerated, while that of the umbilical is diminished. In order to compare these results with those met with elsewhere, I have collected the statistics of St. Bartholomew's and St. Thomas's Hospitals for the same years (1889 to 1900), and of the Middlesex Hospital from 1891 to 1900, and have found a most remarkable discrepancy between the three institutions, the gross mortality being at St. Bartholomew's 32.3 per cent., at St. Thomas's 19.9 per cent., and at the Middlesex 22.6 per cent. Such differences can only be due to local conditions preceding the admission of the patient, and as I am entirely ignorant of these conditions, I have endeavoured to eliminate them by adding all the figures together. We thus obtain the following table of the mortality in these three representative hospitals:

	Cases.	Deaths.	Mortality per cent.
Inguinal	496	99	19.95
Femoral	485	120	24.74
Umbilical	109	49	44.95
Total	1,090	268	24.58

The approximation of the total mortality to that met with in my own cases is so absolutely close that it may perhaps be regarded as correctly illustrative of English hospital practice.

A further point of interest appeared, in analysing my own cases, in the fact that the mortality had tended gradually to diminish, the first 55 cases showing 16 deaths (29 per cent.), while the second 55 yielded only 11 (20 per cent.). A progressive increase of recoveries was also found on dividing the 110 cases into three periods. The far larger figures obtained from the three London hospitals emphasize this improvement in results. In the years 1889 to 1894 (both inclusive) we find 427 cases with 130 deaths, or 30.44 per cent., while in the following six years we have 663 cases with 138 deaths, or 20.81 per cent., a reduction of one-third of the total mortality, and again a remarkable similarity to my own statistics.

This improvement in results can certainly not be attributed solely to improvements in the methods of operating, and is probably to be ascribed to the increasing intelligence of the patients, who more readily accept operation, as well as to an increase of confidence upon the part of the profession in general, with a more emphatic insistence upon the necessity for early interference. Possibly the hospital surgeon himself now operates more readily upon cases which would formerly have been treated by taxis, and would in some instances have been "cured" thereby.

A consideration of the causes of death in our fatal cases is also of interest. In 9 of the 27 cases the intestine was gangrenous or perforated by ulceration at the time of operation, and in 2 at least of these there was general peritonitis; of 10 cases with perforation or gangrene only 1 recovered, the remainder surviving for a few hours only. There remain 18 cases in which the intestine was reduced. Of these 14 died within 24 hours from shock or intoxication. One of these is especially interesting, as an umbilical hernia had been partially reduced, with marked improvement, two days before I saw her. Persistence of symptoms then led to operation in *articulo mortis*, which disclosed strangulation within the sac by a Meckel's diverticulum. Of the 4 still remaining cases one man, aged 84, died on the eighth day from pneumonia; a woman with very advanced mitral stenosis died on the fifth day from exhaustion, and 2 died from sepsis. One of the septic cases was an umbilical hernia with extensive ulceration,

in which disinfection of the operation area was probably imperfect; the wound healed, but death occurred from exhaustion on the eighth day, and a localized intraperitoneal abscess was found beneath the wound. The other was a case of inguinal hernia which ran a normal course for 16 days, when suppuration began around the sac, and was followed by sloughing and exhaustion.

We may perhaps fairly summarize these conditions as follows: Of 27 deaths 9 were due to delay, leading to gangrene, and 14 to delay, which rendered the patient unable to bear the slight shock or to recover from the auto-intoxication of intestinal obstruction; 2 resulted from causes to which the operation was only subsidiary (advanced age and mitral stenosis); and 2 were direct results of the operation *per se*. The septic cases occurred in 1891 and 1894 respectively, since which years there have been great improvements in the equipment and technique of the operating theatres at the Manchester Royal Infirmary.

A further point which appears from these statistics is the importance of age in estimating the mortality of herniotomy: Of 27 fatal cases the average age was 50.2 years, while of 83 which recovered the average was only 41.7. Of the 10 infants and young children none died.

The methods of operation which were adopted varied from time to time. In almost all chemical antiseptics were somewhat freely used, a practice which I have now abandoned. Drainage by rubber tubes was adopted only in a few of the earliest cases; at a later stage gauze drains were employed only very exceptionally, the majority of the wounds being at once closed. The sac having been opened, its contents were always carefully washed with some antiseptic solution; herniated omentum was invariably removed, and the intestine was reduced in all "doubtful" cases. The gangrenous cases fall into two classes. In 8 the patient's condition was very bad, and the intestine was merely opened and left with or without a suture to attach it to the skin, the stricture being divided; of these 7 died. In 1 case several inches of small intestine were resected with end to end union by Maunsell's method; in another the caecum and a small portion of the ileum and colon were excised, union being again effected by Maunsell's method; both of these cases died within a few hours.

After reduction of its contents the sac was usually ligatured or sutured with silk and some method of "radical cure," which varied with the region and has varied also from time to time, was adopted in all but a few of the earlier cases, or in those which were at the time of operation obviously in *extremis*.

Two cases of inguinal hernia, which had been reduced *en masse* and which are fully recorded elsewhere, were treated by median laparotomy, both recovering.⁶

REFERENCES.

- ¹ Lectures on Hernia, London, 1889, p. 88. ² Am. Jour. of Obstetrics, 1890, p. 8. ³ Loc. infra cit. ⁴ St. Bartholomew's Reports. ⁵ Centralbl. f. Chir., 1894. ⁶ Med. Chronicle, vol. xiv, September, 1891.

TWO CASES OF INTERSTITIAL NEPHRITIS IN CONGENITAL SYPHILIS.

WITH REMARKS ON SYPHILIS AS AN ETIOLOGICAL FACTOR IN NEPHRITIS.

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THE following two cases are examples of a form of nephritis which has hitherto received but little attention:

CASE I.

History.—A. C., female, aged 16 months, was admitted to Paddington Green Children's Hospital on September 20th, 1901. The parents were Italians and the father, who was said to have had syphilis, had died of heart disease. There had been one other child who was stillborn. The patient had appeared to be healthy up to the age of 6 months, when the right eye was noticed to be inflamed; the left soon became similarly affected and she began to lose flesh. During the two months before ad-