Session No. 3—7th March, 1957.

From Paediatric Unit, Kandang Kerbau Hospital for Women.

Moderator: DOCTOR GWEN SMITH.

Intestinal Obstruction in the Newborn

Case Reports

Doctor Tay Kah Seng presented 7 cases for discussion.

(1) Oesophagotracheal fistula

(2) Oesophageal atresia

(3) Mucus gastritis

(4) Jejunal atresia

(5) Incarcerated inguinal hernia

(6) Anal stenosis

(7) Imperforate anus.

CASE No. 1: Registered No. 20115/56.

The mother of this baby had antepartum haemorrhage due to abruptio placentae. The baby, a female; B.W. 2 lbs. 10 ozs. was blue and flaccid at birth, and died 4 hours later. Autopsy showed an oesophagotracheal fistula and atelectasis of the lungs.

CASE No. 2: Registered No. 21043/56.

The pregnancy of this case was complicated by hydramnios. At birth, the baby, a male, B.W. 4 lbs. 11 ozs. was pale, flaccid and oedematous.

Choking and cyanosis were produced by attempts to feed, and milk and mucus were aspirated from the pharynx. It was not possible to pass a stomach tube. Coarse crepitations were heard all over the chest. X'ray abdomen showed absence of gas in the gut. The baby was transferred to the General Hospital where he died before radio logical confirmation of the diagnosis of oesophageal atresia.

CASE No. 3: Registered No. 21160/56.

Male baby, B.W. 3 lbs. 8 ozs. Progress was good until the 7th day, when he began to vomit after every feed. Vomitus consisted of bile stained mucus and milk. There was no abdominal distension. No parenteral infection was found. Urine was normal.The stomach was washed out, and ½ ounce 5% dextrose in 0.2% saline—3 hourly was given by tube. A subcutaneous injection of 30 c.c. of 0.5% normal saline was given with hyalase b.d. Milk feeds were gradually increased and 7 days later, the baby was bottle fed. There was no recurrence of vomiting.

CASE No. 4: Registered No. 2393/56.

This was a normally delivered male baby, B.W. 5 lbs. 4 ozs. Aged 20 hours. He began to vomit meconium-like material. There were 3 more vomits in the next 12 hours. The abdomen was not distended. Bowel sounds were heard. Peristalsis of the of the small intestine was seen. A stomach tube was passed easily for 10 inches. The anus admitted the finger for 1½ inches. X'ray of the abdomen showed a loop of dilated small intestine, and absence of gas in the large bowel and the rectum. A diagnosis of upper intestinal obstruction was made. A laparotomy was performed in the General Hospital by Mr. T. A. Sale. Vitamin K. 5 mgm., penicillin and streptomycin were prescribed pre-operative, and an I/V. drip of dextrose (5%)+saline (0.25%) was set up. A jejunal atresia was found at operation The dilated loop of jejunum was resected, followed by end-to-side anastomosis. 70 c.c. of blood was transfused. The baby's post-operative condition was poor. 12 hours after the operation, the baby became dyspnoeic. There were rales in the chest. He died 18 hours later. At autopsy, the anastomosis was patent. The cause of death was haemorrhagic pneumonia.

CASE No. 5: Registered No. 15922/56.

This male baby was one of uniovular twins. The 1st baby was discharged

well after 6 weeks. The 2nd baby developed intestinal obstruction, aged 30 days. He vomited bile-stained fluid four times and the abdomen was very distended. The bowels were not opened for 24 hours. The cause of the obstruction was an incarcerated right inguinal hernia. A herniotomy was performed in the General Hospital. The post-operative course was uneventful. There was no recurrence of the hernia. He was subsequently seen in the paediatric follow-up clinic, and was progressing well.

CASE No. 6: Registered No. 19029/56.

This male baby was delivered by forceps for a prolonged 2nd stage of labour. B.W. 5 lbs. 5 ozs. There was vomiting of bile stained fluid. There was severe abdominal distension. Peristalsis was present and bowel sounds could be heard. A digital rectal examination showed an anal stenosis, half an inch above the anal opening. This was dilated digitally, after which meconium was passed freely. Dilatation was repeated daily His haemoglobin was 52% and the spleen was palpable. A blood transfusion 150 ml. was given.

After discharge, the dilatation of the the stenosis was continued by the mother for two months. There were no bowel symptoms. The child was well, when seen in the follow-up clinic. but the haemoglobin was still 52%. The cause of his anaemia was unknown.

CASE No. 7: Registered No. 4009/57.

Mother's age 40 years. There are 9 other children, who are living and well. The present pregnancy was complicated by toxaemia. B.W. 6 lbs. 10 ozs. The baby was a mongol, and an imperforate anus was diagnosed on on routine examination. Straight X'ray abdomen showed 1 inch gap between anal dimple and gas shadow in large bowel. In the General Hospital a needle was introduced through the anal dimple, and mucous was withdrawn. A cruciate incision was made followed by dilatation by an artery forceps. Meconium passed freely and subsequent progress was satisfactory.

Doctor Smith in opening the discussion said that the common presenting factor in this wide selection of cases was vomiting. Commenting on Case No. 3, she said this was a rather puzzling syndrome, which she called "mucus gastritis." It usually occurred in the first 10 days of life, the case presenting with vomiting of bile stained fluid and mucus, which may be severe enough to cause dehydration. There was no evidenc of parenteral infection, intracranial injury or intestinal obstruction. It was difficult to exclude anomalies of the gut causing partial obstruction. X'ray of the abdomen showed moderately distended coils of gut. These infants responded to drastic reduction of feeds with subcutaneous fluid supplements if required. This baby did stop vomiting when his feeds were reduced to half an ounce. and then gradually increased. The problem lay in the diagnosis. She asked Doctor Field for her opinion.

Doctor Field replied that she had not recognised it as a syndrome. She had seen babies that vomited periodically, for which there was no obvious cause. She had always considered that they were due to some cerebral disorder. This child had no evidence of any disease except for the persistent vomiting.

Doctor Smith then asked Mr. Sale for his opinion as he must have seen many such cases.

Mr. Sale asked whether this child was anaemic. The success of treatment by cutting down the feeds was very suggestive of lax oesophagus. This could be demonstrated by a barium meal. when the barium could be seen to slide back down the oesophagus if the baby was tipped. Many of these cases present as vomiting in early infancy and may be misdiagnosed as pyloric stenosis. He had operated on two in which the diagnosis of lax oesophagus was made by a barium meal which also demonstrated some hold up at the pyloric end of the stomach. There was an argument as to whether the vomiting was due to lax oesophagus or to pyloric stenosis. A Rammstedt operation was done on both of them but vomiting persisted. Both were then treated for lax oesophagus; one was cured by small feeds, and propping him up. The other one had an operation later. It was very interesting that in some cases previously diagnosed as marasmus, some degree of diaphragmatic hernia could be demonstrated. The child should be given a barium meal. to see whether it has a lax oesophagus.

Doctor Smith said that a lax oesophagus would not improve so rapidly following treatment. In this group of cases occurring in the first fortnight the vomiting does not recur.

Mr. Sale replied that oesophagitis, a stricture of the oesophagus or a paraoesophageal hernia would not respond to treatment, and then quoted a case of a child admitted with vomiting, thought to be due to pyloric stenosis: a lax oesophagus was found and that child was treated for only two weeks in hospital and 9 months later, he was symptom free.

An alternative diagnosis could have been neonatal Hirschsprung's disease. There was an article by Ehrenpreiss (1955) in which, he discussed some of these children who have signs of intestinal obstruction without any organic obstruction. Barium enema studies at about six months, demonstrate typical Hirschsprung's disease. Zuelzer and Wilson (1947) discussed this syndrome which they called intestinal obstruction without obstruction. Several children belonging to the same family under his care presented with intestinal obstruction, distension, ladder pattern, vomiting and constipation. a laparotomy was done on every one of them and no cause for the intestinal obstruction was found.

Mr. Sale then said that Ehrenpreiss pointed out that these patients improved following rectal examination, and for six months appear to be well. Professor Yeoh also described this syndrome, in babies admitted with ladder pattern who improved following rectal examination.

Doctor Field discussed the X'rays of a case admitted with vomiting and abdominal distension on the 5th day. On rectal examination there was a tight ring at the anus and dilated bowel above. Following a rectal wash-out the child improved and in 2 days, the distension had subsided.

Mr. Sale said that this was the typical syndrome described. A similar case was admitted to the surgical unit. Hirschsprung's disease was shown by a barium enema. Unfortunately the child died at the age of 1 month.

Doctor Field asked why they appeared perfectly normal after the acute attack.

Mr. Sale replied that probably the bowel hypertrophied. Not all cases presented at birth, many were normal up to 1 year of age.

Dr. Field asked how this condition was differentiated from anal stenosis.

Mr. Sale replied that the presence of a definite anal stenosis established that diagnosis. He quoted an interesting boy aged 3 years who had a history of an anal stenosis which had been dilated quite frequently but who now had a distended abdomen, and clinically, had Hirschsprung's disease. A barium enema showed a small rectum with a big ballooned sigmoid colon resembling a Hirschsprung. The only anomalous feature was that the rectum was full of faeces which was not found in Hirschsprung's disease. It was possible that hypertrophy had occurred and had pushed down the faeces and so dilated the rectum. He proposed to repeat the barium enema after cleaning the faecal masses. Another diagnostic measure was to insert a balloon connected to a tambour to demonstrate absence of peristaltic contractions. He asked if the stools could be examined for trypsin. It was not a standard procedure in his laboratory.

Doctor Smith replied that she had tested stools for trypsin in several cases but had not found a case of fibrocystic disease in Singapore. She asked Mr Sale if he had seen meconium ileus due to fibrocystic disease in Singapore.

Mr. Sale replied that he had seen two cases with meconium peritonitis and one with meconium ileus, but the routine laboratory did not test for stool trypsin. This may have been a mild case, as all cases did not present with the complete clinical picture of meconium ileus. He considered that a full investigation of this child should include estimation of the stool trypsin.

Doctor Field asked if distension was present in meconium ileus as this was marked in her case.

Mr. Sale replied that distension was present in these cases; in his case there was marked distension with very solid stools and mucus. One school of thought said that in order to treat meconium ileus satisfactorily the meconium must not only be made more fluid but the dilated segment above the obstruction be resected

because the grossly dilated bowel was mechanically unable to push the thick meconium through collopsed segments of gut. He thought that this baby should have a barium meal to exclude partial duodenal obstruction due to a band or an annular pancreas. He considered that until all these investigations were done, he would not make a diagnosis of mucus gastritis.

Mr. Sale then showed some slides and discussed the causes of intestinal obstruction in the neonate.

Classification of Causes of Intestinal Obstruction in Neonates (Santulli)

1. MECHANICAL.
   - A. Congenital: (i) Intrinsic
     - (a) Atresia & Stenosis.
     - (b) Meconium ileus.
     - (c) Hypertrophic pyloric stenosis.
     - (ii) Extrinsic—
       - (a) Malrotation with or without midgut volvulus.
       - (b) Volvulus without rotation (localised).
       - (c) Congenital peritoneal bands.
       - (d) Incarcerated hernia — inguinal, diaphragmatic, internal.
       - (e) Annular pancreas.
   - B. Acquired: (i) Intussusception.
     - (ii) Peritoneal adhesions— previous operation. previous infection.
2. NEUROGENIC:
   - A. Defective intrinsic innervation — congenital.
     - (i) Colon and rectum (congenital megacolon).
     - (ii) Small intestines.
   - B. Paralytic Ileus.
     - (i) Cerebral injury.
     - (ii) Infection

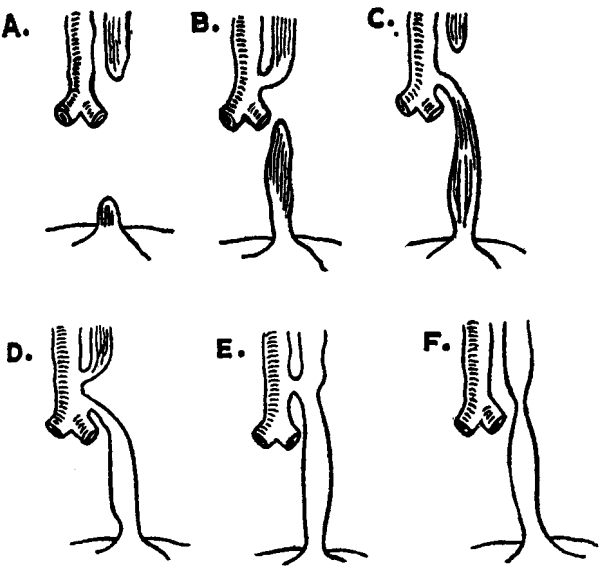
Atresia and stenosis of the Gastro-intestinal tract occurred anywhere from the oesophagus to the anus. Meconium ileus was a form of obstruction due to a lack of trypsin secretion from the pancreas resulting in solid or sticky meconium. Hypertrophic pyloric stenosis also occurred in the 1st month of life.

He then discussed incarcerated hernia, and said that an incarcerated hernia occurring before 6 weeks was more likely to be strangulated than one after 6 weeks. At that age, the internal ring was very firm and felt almost cartilaginous. It was, therefore, more likely to give rise to strangulation. A histological report on a hernial sac at this age showed: "Primitive haemopoietic tissue." He suggested that the neck of the sac contained blood vessels resulting from an attempt by the body to shut the peritoneal sac. He said that a diaphragmatic hernia was far too big to produce an internal hernia. Annular pancreas was an infrequent phenomenon, frequently described in adults in the literature. He had not seen intussusception occurring in a child of less than three months. He emphasised the importance of the neurogenic types. Congenital megacolon (colon and rectum) were more commonly seen because they were well known. The same condition may occur in the small intestines. He had never seen it as heredito-familial disease. In the Archives of Diseases on Children 1951 there is an article on 7 cases of intestinal obstruction in the neonatal period from one family. All had laparotomies and nothing was found except dilated gut. They all died. The 7th child presented aged 7 for cyclical vomiting. X'ray demonstrated a grossly dilated jejunum. A laparotomy was done and histology showed areas of aganglionic jejunum.

He stressed that vomiting and constipation should be regarded as intestinal atresia until proved otherwise. Straight X'ray of the abdomen will demonstrate the abnormal pattern of the gas shadows. It was surprising that people who diagnosed intestinal obstruction in the adult so

easily, should find it so very difficult in the neonate. This is emphasised in a series of 21 cases of which 17 were not seen within 24 hours. Once a diagnosis of intestinal obstruction was made a laparotomy should be done except in Hirschsprung and anal stenosis. The anal stenosis could be dilated quite easily. In Hirschsprung's disease meconium may pass through following forcible dilatation, if not a laparotomy should be done. In cases of atresia there was always a dilated segment of bowel. Dilatation with liquid paraffin or saline showed the amount of pressure required to be built up in this dilated loop in order to push meconium through the small contracted segment. This was often far too great for the stretched intestinal muscle. It was recommended that the stump be amputated. leaving the normal size bowel and then an anastomosis done. This was the procedure he now adopted. None of these babies had lived for more than 8 days. None was diagnosed earlier than 36 hours, one was 36 hours old, and the rest were more than 4 days old. Another school performed a double valve ileostomy or jejunostomy and sucked out the secretions from the proximal loop. Imperforate anus and duodenal atresia are associated with mongolism.

Different types of oesophageal atresia were shown. The commonest type (c) was that where there was a blind upper end, and a fistula into the trachea. This was most easy to deal with. He quoted 4 of his cases: One was alive, two died in the post-operative period, the last one after one month due to breakdown of the wound. The Professor had a case who survived but developed a stricture.



Congenital Abnormalities of the Oesophagus (Ladd)

The most important sign presenting was excessive salivation. A child with large quantities of mucus in the mouth was suggestive of oesophageal atresia. The baby retched and coughed when fed. A straight X'ray of the abdomen and chest was important because it showed whether there was air in the stomach, depending on the type of fistula, and also whether there was aspiration pneumonia. Many of these cases were associated with congenital heart disease. Instillation of 1 c.c. Lipiodol, demonstrates the size and position of the pouch. Immediately afterwards the lipiodol should be sucked out. In order to prevent aspiration the baby was propped up, and secretions aspirated by a tube in the upper pouch. Oxygen and penicillin were sometimes also necessary. He had seen cases satisfactorily transferred from a hundred miles away with a catheter in situ sucking out the mucus.

He then discussed the factors which influenced the high mortality in neonatal surgery. The factors are: (Santulli)

1. *Delayed diagnosis.*
2. Prematurity.
3. Co-existing anomalies.
4. Peritonitis.
5. Shock.
6. Dehydration.
7. Electrolyte imbalance.
8. Nutritional disturbances.

Electrolyte imbalance could be corrected easily only if a first class biochemistry service using micro-methods was available. Of the four types of imperforate anus the first type i.e. anal stenosis was the most difficult to diagnose. The child presented with signs of intestinal obstruction and on rectal examination a stenosis was found. Type four also presented difficulties. There was a normal proctodeum and a normal anal canal with a diaphragm between the upper and lower parts of the rectum and the anus. It was only when distension developed that a lesion was suspected. It was not always easy to feel the diaphragm and he said that 100% mortality has been quoted for this type. One case in his series had survived. A needle was introduced through the diaphragm and meconium aspirated. A cruciate incision with a guarded knife was made and followed by dilatation. Two months later the child was perfectly well.

In the type of imperforate anus where there was just an anal dimple the bowel ended at a variable distance from the skin. If that bowel was pulled down and stretched under tension the stitches would give, and the bowel receded towards the abdomen. At the age of three to five years there was a canal lined with fibrotic tissue through which it was difficult for faeces to pass, and above that was a typical megacolon. Only if the bowel was low, and meconium could almost be seen through it, should operative approach be made from below. We use the X'Ray method of Wangensteen & Rice (1930) but it was necessary to invert the child for half to one hour to allow the air to go to the lower part of the rectum. There were two schools of thought concerning treatment. Rhoades believed in dissection of the blind end of the bowel per abdomen, most of these cases revealed a fistula between the rectum and some part of the urinary tract, often the prostatic urethra. By dissecting out very carefully, a long length of bowel can be obtained and a little hole made over the dimple. An alternative view was that dissection always showed some abnormality of the pubo-rectalis sling. In young babies it was difficult to get a good look at it. A defunctioning transverse colostomy was done and then 12 months later a para-sacral approach was made. The dilated end of the stump of the rectum and the pubo-rectalis sling were dissected out, and the rectum properly inserted through the pubo-rectalis sling, with repair of the pubo-rectalis sling behind, if divarication was present, (Stephens 1953). Mr. Sale said he did not like to do a transverse colostomy on a young baby and preferred the Rhoades method. He had not lost a case at operation, although one or two mongols died of other defects. Follow up of 4 cases showed that they required dilatation for a long time but they were doing quite well.

An ectopic anus in a baby girl, required very careful dilatations and if necessary a simple cut backwards with scissors inside the anus pointing back towards the coccyx.

Doctor Smith said that she fully agreed that salivation was the earliest sign of oesophageal abnormality. If the mucus was not cleared by suction then an oesophageal obstruction should be suspected. She said that this anomaly has occurred in a mongol in one case, and she agreed with Mr. Sale that anal stenosis and mongolism often occurred together. She asked Mr. Sale if any of his cases of anal stenosis had developed anaemia. The child presented today (Case No. 6) had a persistent anaemia. The haemoglobin was 52%. The child was now 5 months and had been fed on a satisfactory milk feed, and had also had a course of Imferon. She said that Hirschsprung's disease was also complicated by anaemia.

Doctor Field said she had not noticed an association of anaemia with this condition. She considered malabsorption of food in gut anomalies to be responsible for poor nutrition.

Doctor Smith then demonstrated X'ray of abdomen in normal babies at birth, and

aged four hours, eight hours, twelve hours, and twenty-four hours showing the normal passage of air through the gut.

Professor Sheares then thanked Mr. Sale for his very interesting talk and the discussion was closed.

REFERENCES

1. EHRENPREISS, T.: Arch. Dis. Child, 30: 8, (1955).
2. FORSHALL, I.; RICKHAM, P. P. & MOSSMAN, D. B.: Arch. Dis. Child, 26: 294, (1951).
3. LADD, W. E.: New England J. Med, 230: 625, (1944).
4. SANTULLI, T. V.: J. Pediat, 44: 317, (1954).
5. STEPHENS, F. D.: Aus. & N.Z. J. Surg., 22: 161, (1953)
6. WAGENSTEEN, O. H. & RICE, C. O.: Ann. Surg, 92: 77, (1930).
7. ZUELZER, W. W. WILSON, J. L.: Amer. J. Dis. Child, 75: 40, (1954).