CONGENITAL HEART DISEASE REPORT ON AN UNUSUALLY HIGH INCIDENCE IN ONE FAMILY

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Congenital heart disease in more than one member of a family, although relatively uncommon, has been reported in the literature on a number of occasions. Abbott (1927) found 11 pairs of brothers and sisters, and Brown (1939) reported six instances. Taussig (1947) has seen four families in which more than one member was affected, and in two of these the condition was transmitted through more than one generation.

The purpose of this paper is to report four cases occurring in one sibship. This is exceedingly rare, and, so far as we can ascertain from the literature, has been reported only once previously. That was by Walker and Ellis (1940-1), who described a father and four out of eight children with persistent ductus arteriosus.

The Family

1. The eldest child was a boy aged 11 years. Signs of persistent ductus were discovered at routine school medical inspection. There was a typical Gibson murmur with thrill, and confirmatory radiological signs. He is awaiting operation.

2. A girl aged 9 showed no cardiac abnormality.

3. A boy aged 8. Signs of persistent ductus were discovered at routine school medical inspection. His lesion was more severe than that of the eldest child. Surgical ligation of ductus was successfully carried out.

4. A girl died in 1946 at the age of 6 months, from what was believed to be pneumonia.

5. A boy aged 5 showed no cardiac abnormality.

6. A boy aged 4. He was the third member of the family with persistent ductus. His was the most severe lesion of the three, there being marked cardiac enlargement and gross engorgement of pulmonary vessels. A successful operation has been carried out.

7. A girl died in 1949, only 13 days old. She was found dead in bed, and the cause was not definitely ascertained.

8. A girl aged 2 years showed no evidence of cardiac abnormality.

9. A boy, a "blue baby," died at the age of 7 weeks. He was seen by one of us a few days before death, and a diagnosis of congenital heart disease was made on the basis of central cyanosis and a moderately loud systolic murmur audible all over the praecordium.

Both parents were examined and found to be normal. There was nothing significant in their past histories; maternal rubella had not occurred, and circumstances were such that adequate nutrition was available. Consanguinity was not admitted. Only a limited investigation of ascendants was possible owing to the fact that most of them resided outside Ireland. No significant abnormality was detected in those examined.

Comment.—In this family there were four definite cases of congenital heart disease, three of them having persistent ductus arteriosus and one cyanotic disease of undetermined type. In addition, two other siblings died in infancy from causes which were not definitely ascertained. In view of

the family history it is possible that a congenital heart lesion may have been a factor in the cause of death. The finding of such an incidence prompted us to review the literature and to consider possible aetiological factors, with particular reference to modern views on the subject.

Aetiology of Congenital Heart Disease

Congenital heart disease and congenital defects in general are believed to be due to genetic or environmental factors.

Genetic transmission, although difficult to prove, has always been considered important. In recent years, however, it has been shown that environment can play a part. Gregg (1941), in a series of 78 cases of congenital cataract occurring after maternal rubella during the early months of pregnancy, found that congenital heart lesions were present in 44. Swan *et al.* (1943) collected details of 31 congenital defects following maternal rubella, 17 of which were cardiac. Of these, seven had patent ductus; the others were varied, but cyanotic cases were not mentioned.

While this is strong evidence in favour of an environmental factor, it does not necessarily mean that maternal rubella is a very important factor in the transmission of congenital heart disease in general. In fact, the available evidence is to the contrary. In Campbell's (1949) series of 300 cases a history of maternal rubella was present in only four instances. In our own experience with a smaller number of cases no instance of maternal rubella has been found. Other environmental factors such as maternal nutritional deficiency have been suggested by Hale (1935) and Warkany (1944). Animal experiments by these workers have shown that congenital defects could be produced in the offspring if the maternal diet was deficient in certain vitamins. Can similar deficiencies cause congenital heart disease in man?

The answer would be obtained if the incidence of congenital heart disease in nutritionally deficient mothers as compared with the normal were known. Needless to say, this would have to be a large-scale survey, carried out as early as possible during pregnancy. So far as we are aware, such a survey has not been done, so that in the present state of our knowledge there is no evidence that maternal nutritional deficiency can cause congenital heart disease in man.

Genetic Factors

The best evidence of a genetic factor would be a positive family history. This is not forthcoming, and may be due to the fact that few women with congenital heart disease marry and have children (Campbell, 1949). However, as Campbell points out, the incidence in collaterals is more common than would be expected by chance. That would certainly be true of the family reported above, in which a genetic factor seems most likely. The collection of further evidence on this matter should be possible in future, in view of the developments of modern surgery. This applies particularly to persistent ductus.

We were unable, in a review of the literature, to obtain figures of the incidence of persistent ductus in population groups, with particular reference to schools. As additional evidence in favour of a genetic transmission of this lesion, we feel that the figures obtained by one of us at school medical inspection in County Roscommon may be of interest.

County Roscommon has a population of 68,000; land acreage is 608,540. The largest urban population is 2,000, so that the population is rural, mainly engaged in farming. The primary school-going population is 10,500, and of these 9,250 were examined routinely at school medical inspection over a three-year period. Fifteen cases of persistent ductus were observed among those examined. Twelve of these were confirmed subsequently by operation, and two of the remaining three by cardiac catheterization. Thus the incidence of persistent ductus among schoolchildren in this county is 1 in 616, or 1.6 per 1,000 examined between the ages of 4 and 15. There was no history of maternal rubella in any of these cases, and, in fact, rubella appears to be

uncommon in rural areas. Consanguinity was not admitted in any case. However, the tendency of farming or village populations to marry locally may be of importance.

This apparently high incidence in a rural population, if confirmed by a larger survey, would be additional evidence of a recessive genetic factor in the transmission of persistent ductus, and perhaps of congenital heart disease in general.

Summary and Conclusions

Details of four siblings with congenital heart disease are presented.

They include three cases with persistent ductus and one with cyanotic heart disease.

The aetiology of congenital heart disease is discussed and evidence indicating the importance of a genetic factor is presented.

Addendum.—Since this paper was sent for publication the diagnosis of persistent ductus in the boy aged 11 has been confirmed at operation.

REFERENCES

- Abbott, M. E. (1927). In Osler's *Modern Medicine*, 3rd ed., 4, 612.
Brown, J. W. (1939). *Congenital Heart Disease*. London.
Campbell, M. (1949). *Quart. J. Med.*, 18, 379.
Gregg, N. M. (1941). *Trans. ophthal. Soc. Aust.*, 3, 35.
Hale, F. (1935). *Amer. J. Ophthal.*, 18, 1087.
Swan, C., Tostevin, A. L., Moore, B., Mayo, H., and Black, G. H. B. (1943). *Med. J. Aust.*, 2, 201.
Taussig, H. B. (1947). *Congenital Malformations of the Heart*. Commonwealth Fund, London.
Walker, G. C., and Ellis, L. B. (1940-1). *Proc. New Engl. Heart Ass.*, p. 26.
Warkany, J. (1944). *J. Pediat.*, 25, 476.

PANCREATICO-DUODENECTOMY FOR RELAPSING PANCREATITIS

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The following case is reported as an example of the excellent result which may be obtained in relapsing acute pancreatitis following a pancreatico-duodenectomy. Although such a result does not help to elucidate the problem of the aetiology of this disease, freedom from further attacks should follow that operation. However, it is not denied that excellent results, either temporary or permanent, may also sometimes be obtained by the use of splanchnectomy, choledochoduodenostomy, etc.

For a variety of reasons a number of surgical measures have been proposed for the treatment of relapsing pancreatitis. These include cholecystectomy and choledochostomy (Mowat, 1951); choledochoduodenostomy (Burt, 1953); choledochojejunostomy with total diversion of the bile (Barclay, 1950); splanchnectomy, unilateral (Mallet-Guy and de Beaujeu, 1950) or bilateral (Connolly and Richards, 1950); subtotal gastrectomy, to cut off the secretin mechanism (Richman and Colp, 1950); sphincterotomy (Doubilet and Mulholland, 1948); and pancreatico-duodenectomy (Cattell and Warren, 1952). There is no doubt that pancreatico-duodenectomy would be the accepted method of treatment in cases with demoralizing pain if it were not for the magnitude of the operation and the risks it entails. Nevertheless, whatever operation is performed it should allow the pancreas and other abdominal viscera to be explored. It is especially important to determine whether or not the gall-bladder and common bile duct are normal.

According to Horton (1950) the first successful pancreatico-duodenectomy for pancreatitis was carried out in 1944 by Clagett. Horton was of the opinion that pancreatitis should be treated by pancreatico-duodenectomy only in most exceptional cases. On the other hand, in 1952 Cattell and Warren concluded that of the procedures they had used pancreatico-duodenectomy had given the best results, and they considered it the current method of choice in the treatment of relapsing pancreatitis.

Case Report

A man aged 40 was referred to me by Dr. R. Jennaway and was admitted to Sydney Hospital on May 23, 1953. For 18 months he had complained of attacks of epigastric pain, often extremely severe and sometimes lasting for 24 hours, but not related to meals. The pain extended to both sides of the abdomen and was only partly relieved by morphine. Rarely, it radiated to the back. At first the attacks occurred every two to three weeks, but for the previous three months attacks occurred every two or three days. On a few occasions vomiting accompanied the pain. Between the attacks his appetite had been good. He had never been jaundiced, and Graham's test showed no abnormality in March, 1952. On February 10, 1953, laparotomy revealed an enlarged indurated head of the pancreas, and the surgeon considered this to be malignant. Other viscera, including the biliary tract, appeared normal, and there was no evidence of any metastasis. Three days later during a severe attack of pain the urinary diastase level was 100 units. Despite the severity of the attacks of pain there was no evidence of alcoholism or drug addiction.

On May 23 his general condition was still good despite the loss of 2 stone (12.7 kg.) in weight during the previous three months, and examination of the abdomen showed no abnormality. His serum bilirubin level was 0.1 mg. per 100 ml. On May 26 a barium-meal examination showed that the stomach was empty in four hours. A deformity with some constriction of the second part of the duodenum was present, and this was producing a mild partial obstruction. (Similar appearances have been reported by Cattell and Warren (1952) in relapsing pancreatitis.)

On May 28 a pancreatico-duodenectomy was performed. Through an upper midline incision the pancreas was palpated and the replacement of its head and body by a hard irregular mass was confirmed, but the consistency of this mass was not uniform. The terminal portion of the tail of the pancreas appeared normal. The mucosa of the duodenum was intact though slightly hypertrophic, and no obstruction of the lumen of the duodenum was demonstrable. The biliary tract and liver appeared normal. There were a few small soft lymph nodes along the upper border of the pancreas, but no definite metastasis was detected.

The peritoneum to the right of the second part of the duodenum was incised, the stomach was divided immediately proximal to the pylorus, and the supraduodenal portion of the common bile duct was divided. The duodenum, together with the head and the body of the pancreas, was dissected free from the superior mesenteric vessels and other structures, and the tail of the pancreas was divided through what appeared to be normal pancreatic tissue about an inch (2.5 cm.) to the right of the hilum of the spleen. Reconstruction was then carried out in the order shown in the diagram. The end of the jejunum was closed about a small tube and was sutured to the peritoneum at the upper end of the abdominal wound. The inner end of this tube (which contained several holes) was passed down the jejunum and into the common bile duct, while its outer end was brought out through the wound. The anastomosis between the common bile duct and the jejunum was made with an outer interrupted layer of cotton sutures and an inner continuous layer of 00 catgut. The cut end of the remnant of the pancreas was fixed into an incision in the side of the jejunum with two layers of interrupted cotton sutures. No