CASE 2

The patient, a girl aged 16 at her death in 1964, was born in Turkey. Her brother died of familial Mediterranean fever amyloidosis at the age of 21.

Episodes of chills, fever, and abdominal pain occurred during the first few months of life. Typical familial Mediterranean fever attacks were observed over the subsequent years at the Tel-Hashomer Hospital. In 1962 nephrotic syndrome appeared. Renal function deteriorated gradually, and in January 1964 amyloidosis was confirmed by rectal biopsy. Peritoneal attacks continued to recur frequently.

In April 1964 she was readmitted during a bout of abdominal pain. Examination revealed Kussmaul respirations, hiccups, and marked dependent oedema. Signs of peritoneal irritation were not pronounced, and the abdomen was not distended. Serum CO_2 was 11 mOs/l. and urea 130 mg./100 ml. The day of observation was marked by continual abdominal pain and persistent vomiting. She died the day after admission.

At necropsy the abdominal cavity contained 1,500 ml. of thick grey fluid. The small intestine, from a point 40 cm. distal to the pylorus, was gangrenous. Numerous fibrous adhesions were present between the intestinal loops. Two arms of a Y-shaped band embraced the gangrenous bowel and strangulated the mesenteric root, the third arm extending to the transverse colon and indenting a jejunal loop. Polarization microscopy revealed amyloidosis with massive involvement of the kidneys, adrenals, and spleen.

DISCUSSION

Peritoneal adhesions of variable extent are a common finding in cases of familial Mediterranean fever that have come to post-mortem examination. These fibrous bands result, apparently, from the organization of the fibrin-rich exudate which appears during the acute abdominal attacks. Since many familial Mediterranean fever patients have been explored and post-operative adhesions are common, it is significant that one of our patients (Case 2) had undergone no previous abdominal surgery. These two cases emphasize the potential dangers of peritoneal adhesions in familial Mediterranean fever and the importance of differentiating the usual innocuous abdominal attack from intestinal strangulation.

The clinical picture of the abdominal attack in familial Mediterranean fever is marked by pain, which rapidly spreads

throughout the abdomen, and occasional vomiting accompanied by fever of 38–39.5° C. The attack reaches peak intensity in 6 to 12 hours, when signs of peritoneal irritation may be so severe as to simulate an intra-abdominal catastrophe. Peristalsis is markedly diminished or absent; bowel movements are absent and fluid levels may be seen in upright films of the abdomen. Symptoms and signs regress gradually over the next 6 to 12 hours and subside completely, even in the most severe attack, within 24 to 48 hours.

The differentiation of mechanical intestinal obstruction from an abdominal familial Mediterranean fever attack should be possible in most cases once the clinician is aware that the need for such a differentiation may arise. The course during the first 24 hours should suggest the diagnosis. In a familial Mediterranean fever attack it is clear within 12 to 24 hours that the patient is well on the road to recovery, even if the attack has not completely subsided. Intestinal strangulation, however, is marked by progressive deterioration. In a familial Mediterranean fever patient the absence of fever, the continuance of vomiting, and the appearance of an abdominal mass, even early in a bout of abdominal pain, should alert the physician to the possibility that this may not be the usual familial Mediterranean fever attack. To avoid unnecessary laparotomy the patient should be kept under close observation until the course has clarified the diagnosis.

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REFERENCES

- Heller, H., Sohar, E., and Sherf, L. (1958). *Arch. intern. Med.*, **102**, 50.
Gafni, J., and Heller, J. (1961). *Ibid.*, **107**, 539.
Mamou, H., and Cattani, R. (1952). *Sem. Hôp. Paris*, **28**, 1062.
Priest, R. J., and Nixon, R. K. (1959). *Ann. intern. Med.*, **51**, 1253.
Sohar, E., Pras, M., Heller, J., and Heller, H. (1961). *Arch. intern. Med.*, **107**, 529.

Mechanical Haemolytic Anaemia after Mitral-valve Replacement

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Mechanical haemolytic anaemia after aortic-valve replacement has been described by a number of observers (De Cesare, Rath, and Hufnagel, 1964; Gehrmann and Loogen, 1964; Marsh, 1964; Reed and Dunn, 1964; Stevenson and Baker, 1964; Sears and Crosby, 1965). Kloster, Bristow, and Griswold (1965) reported that out of 127 patients who underwent aortic-valve replacement by a Starr-Edwards prosthesis 5% developed chronic haemolytic anaemia. They mention, in addition, that out of 97 patients who underwent mitral-valve replacement only one developed chronic haemolysis, and this was associated with regurgitation around the prosthesis. The present report describes a similar occurrence in a patient after mitral-valve replacement.

CASE REPORT

A woman aged 57 was quite well until February 1964, when she developed a cough with frothy sputum, dyspnoea on exertion,

and ankle oedema. She was treated with digoxin and diuretics, and in December of the same year was admitted to hospital for further investigation. While in hospital she developed acute pulmonary oedema. A diagnosis of mitral incompetence due to anterior-papillary-muscle dysfunction was made, and surgical intervention was advised.

Open-heart surgery was performed on 5 May 1965. The heart was exposed through a left thoracotomy, and the patient was attached to a Melrose oxygenator. The mitral valve was exposed through a left atrial incision, when the mitral insufficiency was found to be due to a ruptured chorda tendineae of the valve cusp. The mitral cusps were excised, and a 2.25-cm.-diameter polypropylene mitral-valve prosthesis (Hammersmith Mk. III pattern) was inserted.

After operation her progress was satisfactory, and she was discharged for convalescence six weeks later. During convalescence her condition gradually deteriorated, with increasing dyspnoea on mild exertion, persistent cough with frothy sputum, and ankle oedema, followed later by slight jaundice. On examination 12 weeks after operation she was pale and slightly icteric, with a mitral pansystolic murmur and sacral and ankle oedema. Post-operative haemodynamic studies revealed that she still had severe mitral incompetence. At this time the haemoglobin had fallen from its immediate post-operative level of between 15 and 16 g./100 ml. to 8.7 g.

Laboratory Investigations.—Nineteen weeks after operation the haemoglobin level had fallen to 6.4 g./100 ml.; the reticulocyte count was 14% (Fig. 1); packed cell volume 24%; red blood cell

count 2,400,000/c.mm.; leucocyte count 6,000/c.mm. (differential count normal); platelet count 257,000/c.mm. Stained blood films showed moderate numbers of deeply staining, contracted, distorted red cells and red-cell fragments (Fig. 2). Polychromasia was conspicuous but no Heinz bodies could be demonstrated. The patient's serum was yellow and contained methaemalbumin and free haemoglobin (18–26 mg./100 ml.). Haptoglobins were absent. Serum bilirubin varied between 2 and 2.6 mg./100 ml. Routine liver-function tests were normal. The direct Coombs test was

FIG. 1.—Haematological changes and transfusion requirements of a patient with mechanical haemolytic anaemia after mitral-valve replacement. During operation 8 litres of blood were used in association with an extracorporeal circulation.

FIG. 2.—Photomicrograph of a blood film of the patient a few months after operation. A number of deeply staining, contracted, distorted red cells and red-cell fragments are present. ($\times 610$)

negative, and no abnormal antibodies could be demonstrated in her serum with normal or enzyme-treated cells. The direct Donath-Landsteiner, Ham's acidified serum, and cold-antibody lysis tests were all negative.

The urine was first examined for haemosiderin 12 weeks after operation, and since that time moderate amounts have been found to be constantly present.

The patient's own red cells labelled with ^{51}Cr were eliminated at an unusually rapid rate, the ^{51}Cr half-time being between 14 and 15 days. Surface body counting showed no evidence of increased activity in the liver or spleen.

DISCUSSION

Apart from iron deficiency the patient's blood was normal before operation, suggesting that the operation was in some way responsible for the anaemia. The investigations indicate that she was suffering from intravascular haemolysis, and the findings were exactly similar to those reported as occurring in patients with chronic haemolytic anaemia after aortic-valve replacement. The morphological changes in the red cells were in fact also the same.

In those cases of chronic haemolytic anaemia after aortic-valve replacement in which a second operation has been performed dehiscence of the valve with consequent regurgitation has been a constant finding (Gehrmann and Loogen, 1964; Stevenson and Baker, 1964), and with one exception repair of the valve has led to cessation of the haemolysis (Reed and Dunn, 1964). In these cases the haemolysis has been thought to be due to actual damage to the red cells caused by undue turbulence around the valve. The fact that the present case had evidence of mitral incompetence would suggest a similar mechanism.

The observations of Kloster *et al.* (1965) would seem to indicate that mechanical haemolytic anaemia is a more frequent complication of aortic-valve replacement than of mitral-valve replacement. At this hospital 54 patients have survived aortic-valve replacement, and six of these developed mechanical haemolytic anaemia. Fourteen patients have survived mitral-valve replacement, and only one of these (the present case) has developed haemolytic anaemia. In this series it is at present impossible to confirm the results of Kloster *et al.* because of the small number of mitral-valve replacements that have been performed. However, the apparently greater incidence of mechanical haemolytic anaemia reported after aortic-valve replacement could possibly be due either to the greater technical difficulty associated with obtaining secure attachment of an aortic prosthesis or, as suggested by Kloster *et al.* (1965), that a mitral-valve prosthesis is situated in a relatively low pressure system.

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REFERENCES

- De Cesare, W., Rath, C., and Hufnagel, C. (1964). "Haemolytic Anaemia following Aortic Valvuloplasty." Abstracts 10th Congress of the International Society of Haematology, Stockholm.
- Gehrmann, G., and Loogen, F. (1964). *Germ. med. Mih.*, 9, 441.
- Kloster, F. E., Bristow, J. D., and Griswold, H. E. (1965). *Progr. cardio-vasc. Dis.*, 7, 504.
- Marsh, G. W. (1964). *Lancet*, 2, 986.
- Reed, W. A., and Dunn, M. (1964). *J. thorac. cardiovasc. Surg.*, 48, 436.
- Sears, D. A., and Crosby, W. H. (1965). *Amer. J. Med.*, 39, 341.
- Stevenson, T. D., and Baker, H. J. (1964). *Lancet*, 2, 982.