this, and suggests that turgescence of the vitreous causes the lens to move forwards and so brings about obstruction. In recent research on the incidence of acute glaucoma he describes the close parallelism between the reactions of the iris to that of the skin, showing that when the iris is scratched there is a dilatation of the capillaries locally, followed by arteriolar dilatation of the whole of the iris with an increase of temperature and capillary permeability. This latter factor of capillary permeability initiates the rise of intraocular pressure by disturbance of osmotic equilibrium. The close resemblance which this bears to the triple response of Lewis will then be realized, for all three components are present in each reaction. It therefore seemed profitable, seeing that the response of Lewis was due to H-substance or histamine, to study the effect of this substance on the eye, and to discover the presence of this substance in the aqueous in cases of acute glaucoma.

By previous animal experiments it was found that histamine injected into the anterior chamber of the eye—the intraocular pressure all the while being kept constant—produced a rise of intraocular pressure, which was not brought about by an equal amount of normal saline. When injected into the blood stream there occurred a fall of blood pressure due to peripheral vasodilatation, and a coincident rise of intraocular pressure, provided the capillaries maintained their tone. Friedenwald has shown that the histological findings of animal eyes into which histamine had previously been injected conformed in close degree to the pathological findings of eyes removed for acute glaucoma. There appeared, then, to be a close relation between the effects of histamine on the eye and the clinical picture of acute glaucoma. If histamine could be detected in the aqueous of these cases a further link would be established.

The method of detection chosen was the production of a flare by intracutaneous injection: colour reactions and methods of biological assay were not considered suitable. Four cases of primary acute glaucoma were taken and equal amounts of aqueous and saline were injected on to the flexor surface of the forearm. The next day 0.1 c.cm. of 1 in 1,000,000 histamine solution was injected in order to prove that the patient would react to histamine if present. In no case was a flare produced by injection of the aqueous, although all cases reacted to an injection of histamine. At the present, therefore, a vasotoxic substance has not been detected by these experiments, whereas Friedenwald claims to have produced a wheal by the injection of the aqueous in a similar case; his patient, however, had been subjected to an operation a week previously.

It is proposed to extend these experiments, as it is realized that no final conclusion can be based on such a small number of cases, and the possibility that acetylcholine may be the vasotoxic agent.

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PRIMARY THROMBOSIS OF THE AXILLARY VEIN

WITH REPORT OF A CASE

BY

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This condition, although rare, is easily recognized, and there are a small but increasing number of cases reported in the current literature. It is interesting that in 1875 Sir James Paget¹ reported a case of axillary thrombosis. This was described, with others, in an article entitled "Gouty Phlebitis," but from his careful description it would appear that this was a genuine case of primary thrombosis. In 1920 Cadenat² was only able to collect twenty-seven reported cases of this condition. In this connexion the use of the term "primary thrombosis" is limited to those cases in which no obvious cause, such as a mass of malignant glands in the axilla, is present.

The characteristics of this lesion are as follows:

- The right arm of a healthy male adult is affected, the age period ranging generally between 20 and 30 years.
- The immediate history nearly always includes recent trauma, or some exceptional effort, with the arm in the abducted position.
- The affected arm is swollen from the fingers to the level of the base of the axilla. This swelling is generalized, regular, and does not pit on pressure.
- The skin is slightly cyanosed. Dilatation of the superficial veins can be seen over the pectoral region and the antero-lateral chest wall.
- A firm, tender cord is palpable in the vicinity of the axillary vein.
- Pain and tenderness are usually present.
- There is no pyrexia or constitutional disturbance, and the individual appears to be healthy in all other respects.

Wilson³ reports two cases in which complete paralysis of the arm was present. Nerve involvement has not been observed in this country, apart from one case reported by Willan,⁴ in which a definite tumour was present in the axilla. In one of Wilson's cases occlusion of the artery had also occurred, so is not comparable with the condition here described. The diagnosis presents no difficulty. The treatment consists of rest and elevation of the arm; later gentle massage may be given with benefit. There is only one recorded case in which embolism occurred. This was a case quoted by Ruge⁵ in which Schepelmann explored and removed the thrombus. The prognosis is uniformly good. Complete functional use, with subsidence of the swelling, occurs within periods varying from a fortnight to several months. It is evident, then, that operative interference is unnecessary and dangerous. Slight residual symptoms, such as occasional aching pain and oedema after marked effort, may persist for some time, but are negligible. In one case described by Firth and Mackay,⁶ after involvement of the right arm, a similar condition was observed on the left side some months later. This also completely subsided.

CASE RECORD

The following case was seen by me recently:

A healthy male, aged 27, went to bed normal in every respect. On awakening the following morning he found his right arm heavy and swollen. On examination the limb was slightly cyanosed, swollen from the fingers to the level of the base of the axilla, and did not pit on pressure. A few days later a non-tender, indurated cord was felt in the axilla,

apparently extending to the apex of the space. Dilatation of the superficial veins was present in the brachial and pectoral regions and antero-lateral chest wall. At no period was there any pain or tenderness, and the brachial and radial pulses were normal. A full blood count, including an estimation of the platelets, revealed no abnormality. The Wassermann reaction was negative, and an x-ray of the chest and the root of the neck showed no unusual feature. He was treated by rest, elevation, and later by massage. During the weeks that followed, the dilatation of the superficial veins steadily increased as the swelling subsided. At the same time the thrombosed axillary vein became less defined and less indurated. At the time of writing—two months since the onset—the swelling has almost disappeared, but the skin still betrays a slightly cyanotic tint. There is marked dilatation of the superficial veins in the pectoral region, and the axillary vein can still just be defined. As far as possible, it would appear that trauma and strain can be excluded in this case. Although his occupation was that of a furniture remover, for five days prior to the onset of the swelling he had been enjoying his annual vacation. During these five days he had not indulged in sport or effort of any description.

DISCUSSION

It is the causation of this condition which has excited so much interest, particularly on the Continent. Among the recorded cases there are extremely few in which trauma and strain can be excluded. So much is this so that the condition is frequently known as "Phlébite par effort" (Cadenat). Pellot⁷ records a case without apparent injury, and two patients awoke in the morning to find their arms swollen (Ruge and Wilson). The present case appeared worth recording in view of the fact that in so few cases did the onset of swelling occur during sleep.

The various theories as to the causation may be summarized thus:

Cadenat.—A venous dilatation and stasis due to an expiratory effort, combined with single or repeated muscular strains, injuring the intima of the venous tributaries at their junction with the axillary vein.

*Lowenstein.*⁸—A venous dilatation and stasis due to an expiratory effort, combined with marked abduction of the arm. The latter movement produces indentation of the axillary vein by the costo-coracoid ligament. In Lowenstein's view this effect is increased by the action of the subclavius muscle.

*Pearce Gould and Patey.*⁹—A sudden contraction of the subclavius muscle tears the delicate subclavio-axillary valve in the long axis of the vein. This is more likely to occur during a marked expiratory effort causing venous dilatation and stasis, and with abduction of the arm.

Wilson.—Some specific lesion of the venous intima. One of his cases was reputed to be syphilitic, while the other died of advanced phthisis. The former case, however, had repeated negative Wassermann reactions, while in the latter the brachial artery was also occluded.

Earlier theories are those of Willan, who suggested that the axillary vein suffered damage against the outer border of the first rib during vigorous exercise with the arm in the abducted position, and of Ruge, who considered that the thrombosis of the axillary vein might be the first symptom of latent heart disease. There appears to be little or no evidence to support these contentions.

What the causation may be in these isolated cases, in which traumatism can, as far as possible, be excluded, remains unsolved.

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ACUTE HAEMOLYTIC ANAEMIA IN ADOLESCENCE

BY

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The following case exemplifies a type of acute haemolytic anaemia, occurring in adolescence, which has been recorded from time to time of late years. Dr. L. J. Witts, in the Goulstonian Lectures of last year, focused attention upon this class of case in an illuminating way, and, by differentiation, clarified the diagnosis of various anaemias in a manner most helpful to the general practitioner. It seems probable that the type referred to is not so rare as was supposed, and that improved methods now in use of staining, recognizing, and interpreting embryonic forms of red cells will help to bring this type of acute haemolytic anaemia to identification at an early stage, and so reduce its present high mortality.

CASE RECORD

D. B. S., a secondary school boy, aged 17, felt well and appeared to be in good health till July 24th, 1932. On that day, while in chapel, he felt slightly giddy and weak. Next day, in school, he felt shivery, with headache and lassitude. On the following day he went to bed with a temperature of 103° F. and a severe headache. He looked pale, vomited, and was thought to have influenza. Medical advice was sought on July 27th, when the following symptoms were pronounced: headache, pyrexia, restlessness, occasional vomiting, and faintness. There were no physical signs of illness in the throat, chest, or alimentary system. The urine and cerebro-spinal system were normal. There was an unusual pallor. Next day these symptoms were accentuated, and the patient was removed to a private hospital. The pallor was more noticeable, he felt faint on sitting up, and was unable to walk or stand unsupported. The maximum temperature was 104°, pulse 135, and respirations 26. During the same evening there was a copious normal movement of the bowels, and vomiting ceased from that time.

On the 29th the temperature remained normal and the patient felt better; but on the following day his condition relapsed, the temperature again rose, and remained between 100° and 102° for several subsequent days. The boy was now extremely pale and restless, and a blood count disclosed a high degree of anaemia, with 1,200,000 erythrocytes, 40 per cent. haemoglobin, and a colour index of 1.6. Next day the red cells were down to 1,040,000 and haemoglobin to 35 per cent., colour index 1.7. For the next two or three days he was incontinent of urine, delirious, and extremely restless. Vomiting had entirely ceased, however, and he was retaining milk-and-soda, orange juice and glucose, and liver both in the form of extract (four phials per day, each estimated as equivalent to three and a half ounces of raw liver) and also three ounces daily of fresh raw liver. On August 1st, while he was at his worst, transfusion of 350 c.cm. of blood was performed. Next day the restlessness was decidedly better and his mental condition had improved. On August 3rd continence returned, and there was an improvement in general condition. This improvement was more pronounced on the following day, when the temperature was down to normal, the pulse to 80, colour was returning, and appetite had reappeared. Red cells were now 1,280,000, haemoglobin 45 per cent., and colour index 1.7; megaloblasts had appeared in the film, and nucleated red cells were very numerous.

From this time on a flowing tide of recovery set in without remission. By August 9th his appetite was voracious, and he was eating freely of red meats, vegetables, puddings, and fruit juices, in addition to two phials of liver extract and three ounces of raw liver taken in hot soup. During the subsequent three weeks the improvement continued steadily in every respect, while the patient manifested the euphoria and *joie de vivre* so characteristic, especially in youth, of convalescence from severe illness.