always parallel the bleeding-time (Irvine and Jones, 1957). Although there is clinical evidence that oestrogens may promote haemostasis (Jacobson, 1954) the actual mechanism of action is unknown. It has been suggested that oestrogens may influence the production of prothrombin and factor V (Johnson, 1957), capillary permeability (Wells, 1958), or platelet function (Frazer, 1958). It is of interest that studies of platelet function showed a qualitative defect when performed in 1954 before the onset of oestrogen therapy (Neely *et al.*, 1955). When next repeated in 1960, three months after discontinuing oestrogens and more than three and a half years since the patient's last spontaneous gastro-intestinal haemorrhage, no functional abnormality of platelets could be demonstrated.

If the oestrogen effect is limited to the correction of a single defect it is obvious that oestrogens will not be of value in all cases, as von Willebrand's syndrome includes different combinations of haemostatic defects. None the less, in view of the seriousness of gastro-intestinal bleeding in these patients and of the probable life-saving effect noted in our patient it would appear that this therapy should be tried in such cases.

Summary

A case is described of a girl with a prolonged bleeding-time associated with a severe deficiency of A.H.G. Bridge anticoagulant, which has previously been reported as absent in patients with von Willebrand's syndrome, was present in her plasma.

Between the ages of 4 and 8½ years this child was admitted to hospital on 29 occasions because of massive spontaneous haematemesis; she required 26 transfusions and received 53 pints (30 litres) of blood. She was then treated with oestrogens. With the exception of the first month she had no gastro-intestinal bleeding throughout the three and a quarter years of treatment.

It is suggested that prolonged oestrogen therapy may be of value in some patients with this condition.

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OBSTRUCTION OF CENTRAL RETINAL ARTERY ASSOCIATED WITH CHOREA

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Arterial obstruction of the retina in Sydenham's chorea is of extreme rarity. There have been few references in the literature to its occurrence (Swanzy, 1875; Thomas, 1901; Harms, 1914; Coats, 1914; Knapp, 1918; Langdon, 1925; Milnes Bride, 1937), and most of them suggested that the occlusion was due to embolus by a vegetation from a heart valve affected by coexistent rheumatic endocarditis. Only one of these reports is later than 1925, and in making this suggestion they reflect one of the opinions held at that time regarding the aetiology of chorea.

The embolic theory of the causation of chorea is no longer acceptable, and it is now obvious that there is no pathology common to all cases of chorea. In some cases inflammatory changes predominate, in many studies degenerative changes are the only finding, and in some vascular changes occur as the principal feature. The variation in appearances from case to case is so wide as to suggest that chorea is not a disease but a syndrome.

A case has recently been observed in which the association of a retinal artery occlusion with symptoms of chorea suggested a common vascular pathology to both phenomena. It is here reported as an interesting rarity and as possibly making some minor contribution to the pathology of chorea.

Case Report

A single woman aged 20, employed as a clerk, attended hospital on February 7, 1958. She stated that on coming down to breakfast at 7.45 a.m. her left eye became completely and suddenly blind. After what seemed a few minutes there was some improvement, and by the time she reached hospital she found that she could see the upper half of objects. There was no pain associated with the loss of vision.

On examination of the eyes her visual acuity was found to be right, 6/6; left, hand movements. The right eye showed no abnormality, with a full visual field. The left eye showed an obstruction of the superior branch of the central retinal artery, with oedema above the macula which stood out as a "cherry spot." There was a loss of the whole lower visual field.

Immediate retrobulbar injection of carbachol 0.25 mg. was given, and after general examination had shown no abnormal finding this was followed by a retrobulbar injection of tolazoline hydrochloride B.P.C. 25 mg. Oral treatment was continued in a dosage of 50 mg. q.i.d. The patient was admitted for investigation and treatment.

After the first retrobulbar injection the disk was examined more closely; overlying the bifurcation of the main trunk of the central artery was a tuft of diaphanous material appearing rather like an early retinitis proliferans, and, above this, fragmentation was seen in the blood column of the superior temporal branch.

The next day the tuft was smaller, the upper vessels were wider in calibre but still narrower than those below, and

there was no longer any fragmentation of the blood column. Pulsation could not be felt in the superior vessels. Subjectively, her vision was further improved, and on confrontation her peripheral field was partly recovered in all meridians, but a lower altitudinal scotoma persisted.

On February 10 it was noted that there was no past history of serious ill-health or previous history of acute rheumatism. Pyrexia to 99° F. (37.2° C.) had been recorded on two occasions since admission. The skin was warm and moist; the mitral first sound was duplicated, but otherwise clinical examination showed nothing abnormal. The blood-pressure was 120/80. The blood count was within normal limits and the sedimentation rate was 7 mm./hour (Wintrobe).

Embolism from a vegetation of bacterial endocarditis could not be excluded at that stage, and she was transferred to a medical ward for investigation. The white-cell count remained within normal limits and the erythrocyte sedimentation rate at a normal level. Three blood cultures were negative. X-ray examination of the chest and screening showed no abnormality.

She remained under in-patient observation without treatment until February 27, when it was noted that she had developed hypermotility, grimacing, and purposeless movements of the limbs; all reflexes were brisk, sustained kneejerks were present, the typical hyperextension of the outstretched fingers appeared, and the hands when raised above the head were everted. The appearances were typically those of Sydenham's chorea. As these phenomena might have been fleeting, and as the diagnosis of chorea was not susceptible to proof by objective tests, clinical confirmation seemed desirable to exclude observer error. She was therefore seen in consultation by Dr. M. E. Disney, consultant paediatrician, and Dr. E. R. Bickerstaff, consultant neurologist, who concurred in the diagnosis of chorea.

She was treated with sodium salicylate 12 g. daily, with serum salicylate studies on alternate days. By March 15 she was much improved, and by March 27 the signs of chorea had disappeared. The erythrocyte sedimentation rate and electrocardiogram had remained normal throughout. There was at no time evidence of carditis.

She was discharged from hospital on March 31 and from that date has received sulphadimidine 1 g. daily. A short-term fever of undetermined origin occurred on April 22, 1959, and persisted for four days; otherwise the patient has remained well. No evidence of a cardiac lesion has appeared.

Vision.—When the eyes were re-examined on June 13 the fundus appearance was normal apart from reduced calibre of the superior branch of the central artery (see Figure). She still showed an altitudinal scotoma, with impairment of the lower peripheral field. Her vision had improved to 6/36 (6/24 when fixing eccentrically). Subsequently further improvement of acuity took place to 6/5 with reduction in the size of the scotoma, which, however, still split the central field horizontally.

Review of Literature

Langdon (1925) refers to 11 reported cases of embolism of the central retinal artery among the ocular complications of chorea (Swanzy, 1875; Thomas, 1901; Harms, 1914; Coats, 1914; Knapp, 1918). Not all of these were fully described, but all cases showed a sudden loss of vision in one eye of a patient with established chorea. The first examination of the eye had been made in most cases after an interval of a few hours. In a few cases the patient's eyes were examined after a longer interval up to 10 years; in the early cases the affected artery was found to be "small, pale but not quite empty, the retina hazy around the disk and a cherry spot at the macula"; "normal retinal vessels except the inferior temporal artery, which had collapsed; haze of the retina

and a 'cherry red' spot at the macula"; "a small plug at the bifurcation of the superior and inferior arteries, the arteries themselves being small, the veins about normal in size, and a cloud in the temporal portion of the retina, with the macula spot showing dark red." The later findings in most were of complete optic atrophy, as one would expect in total blindness from occlusion persisting for any length of time.

The case described by Swanzy (1875) and quoted by Langdon (1925) was most interesting, because the original occlusion did not appear to be complete, although the eye at first examination was totally blind. Both the chorea and the vision had improved, three weeks later, when the patient was able to count fingers at 5 in (12.5 cm.). The disk gradually paled and the inferior nasal branch of the artery collapsed, later to have its blood column return. No cardiac disease could be found in this case. The chorea coincided in its onset with the blindness and affected particularly the left arm and leg. Swanzy's case differed from the other reported cases in these respects—the almost simultaneous onset of the chorea and blindness, the incomplete nature of the obstruction, and the partial recovery of vision. In none of the other reported cases was there any visual recovery.

In addition to these cases collected by Langdon, which dated from 1875 to 1924, we have traced only one other case report. Milnes Bride (1937) reported a case which he thought to be due to embolism in association with chorea. No details were given of the findings on general examination, but he implied that no heart disease was found.

Discussion

It was felt by earlier authors that most of these retinal arterial obstructions occurring in the course of chorea were due to emboli, although this had never had general acceptance. Thomas (1901) maintained that emboli affecting the corpora striata were the most probable cause of chorea, but pointed out that few cases of chorea coming to necropsy showed any evidence of emboli and threw doubt on the embolic theory without offering any other explanation. Arnold Knapp's (1918) case of retinal artery obstruction and chorea also showed the presence of endocarditis, and Knapp

Left fundus appearance on June 13, 1958.

suggested that the appearance of this retinal embolism supported the theory which held chorea to be of embolic origin. Langdon (1925) concluded also that his case was due to embolism.

It is noteworthy that out of five cases of retinal arterial obstruction where the state of the heart was reported (Swanzy, 1875; Knapp, 1918; Langdon, 1925; Milnes Bride, 1937) two—those of Swanzy and Milnes Bride—were said to show no evidence of endocarditis. Our case falls into the latter group.

The theory that chorea was due to multiple emboli never enjoyed complete acceptance and now has no support. Greenfield and Wolfsohn (1922) quoted 15 references from the earlier literature noting Kirkes and Hughlings Jackson as expounding the "embolic theory" of chorea and Bastian as offering a "thrombotic theory," "the corpora striata and adjacent parts being the seat of a subacute inflammation characterized in part by the production of multiple minute thromboses." Other authors were quoted as reporting changes principally in the architecture and staining properties of the neurones. There was so much variety from case to case in the pathological changes observed by the authors quoted by them that Greenfield and Wolfsohn "concluded from a study of the above that there was still much to be written about the pathology of the disease." They described a necropsy study of their own on a female patient aged 7 years who died of acute chorea and in whom vegetations were found on the mitral and aortic valves. Vascular changes were present everywhere in the brain. Many of the cortical vessels had undergone thrombosis and some of the smaller vessels showed plugging by clumps of leucocytes. Many of the capillaries showed proliferation of their endothelial lining, and outside these there were in many places chains of small round cells.

They concluded that if emboli did occur in chorea these could not be the cause of symptoms since (1) chorea did not occur in ulcerative endocarditis, nor did the symptoms of cerebral embolism correspond to chorea; (2) many cases of chorea occurred where there was no disease of the heart valves and therefore no source for the hypothetical emboli; and (3) it seemed impossible to believe that the symptoms produced by an embolism would have yielded so rapidly to treatment as those of acute chorea frequently did.

Subsequent histological studies have been few. We have traced two cases reported by Buchanan, Walker, and Case (1942), one by Bauer, Riley, and Cohen (1950), one by Colony and Malmud (1956), and two reported by Maurice Lessof (1958).

These scattered, more recent reports confirm the findings of Greenfield and Wolfsohn (1922) that there is no pathology common to all cases of chorea. The arguments against an embolic pathology advanced by them still appear relevant, but these arguments would not be valid when applied to a concurrent retinal arterial occlusion. In fact, the occurrence of a fibrin embolus seems a possible explanation for this event, although this explanation would be more acceptable in those cases where acute rheumatic endocarditis had been detected. However, there is evidence that widespread vascular changes occur in the brain in some cases of chorea, appearing as thromboses or endothelial proliferation. It is felt that these phenomena cannot be excluded as causes of the retinal arterial occlusion in the case here reported.

Summary

A case of retinal arterial obstruction is reported in which chorea was subsequently observed.

Twelve other cases of retinal arterial occlusion in association with chorea have been traced in the literature.

Possible causes for this disorder are discussed.

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Medical Memoranda

Protein-secreting Tumour of Stomach: Severe Hypoproteinaemia Cured by Removal of Gastric Polyp

Severe hypoproteinaemia is always a sign of disease, in some cases due to easily recognized external loss of protein (nephrosis, burns, bleeding), in others to a reduced production (liver diseases and chronic infections) or increased internal breakdown of albumin (fever, A.C.T.H. therapy).

Recent investigations have shown that idiopathic hypoproteinaemia, too, is not a disease *sui generis*. In all the studied cases the hypoproteinaemia was due to loss of protein (primarily albumin) into the lumen of the gastro-intestinal tract (Gordon, 1959; Schwartz and Jarnum, 1959; Young *et al.*, 1959; Gross *et al.*, 1960; Jarnum and Petersen, 1961). Here the proteins are digested by the enzymes, and, as the liver is unable to increase its albumin production sufficiently, hypoproteinaemia results. This so-called "protein-losing gastro-enteropathy" (*Lancet*, 1959) has proved to be associated with different diseases: hypertrophic gastritis, gastric carcinoma, granulomatous diseases of the small intestine and mesentery, and regional enteritis. The loss of protein can even take place through a small intestine without any striking gross or microscopical changes.

A case of excessive hypoproteinaemia caused by gastro-intestinal loss of protein from a gastric tumour is here reported.

CASE HISTORY

A 73-year-old man was admitted to the neurological department, Copenhagen County Hospital, Glostrup, because of a suspicion of brain tumour. He had had no serious illnesses previously, but two years before admission oedema of feet and legs started, gradually spreading upwards. The oedema had not caused any great discomfort. He had eaten ordinary food and had not had any gastro-intestinal complaints whatsoever. Marked exacerbation of the leg oedema, enlargement of his girth, and dizziness and