The triad of persistent pyrexia, progressive anaemia, and splenomegaly can be explained by the continual contamination of the blood-stream by these organisms of relatively low virulence. This is in strong contrast with the history of the rapidly fatal septicaemia (Case 6) where the virulent coagulase-positive staphylococci produced an abscess around the valve and invaded the blood-stream, causing embolic abscesses in the lungs. Further support for the concept of persistent bacteraemia is that in none of the cases was there any evidence of embolic foci in lung, brain, kidney, bone-marrow, intestinal vessels, or skin.

The treatment of this condition has been described in a separate article (Callaghan *et al.*, 1961). Systemic and intraventricular methicillin did suppress the clinical signs, but relapse was immediate on discontinuing the drug. The only absolute cure was removal of the valve.

In the past few years much attention has been paid to the role of the staphylococcus in human disease. Generally speaking, the coagulase-positive strains have been clearly associated as human pathogens, whereas the coagulase-negative strains were usually regarded as contaminants when obtained in pure culture from the blood. Recently, however, evidence has accumulated to prove that the negative strains cannot always be so regarded (Fleming and Seal, 1955; *Lancet*, 1956, 1958; Smith *et al.*, 1958). The report of coagulase-negative staphylococcal endocarditis after mitral valvotomy has demonstrated the pathogenicity of this organism (Resnekov, 1959), while the natural history of the syndrome described here adds further evidence to this concept. Thus coagulase-negative staphylococci were repeatedly cultured from the blood of patients with the syndrome. After exteriorization of the internal jugular catheter the signs and symptoms all disappeared, the blood cultures became sterile, yet the C.S.F. draining externally still contained the coagulase-negative staphylococci. Finally, culture of the component parts of the valve after removal produced a pure growth of the coagulase-negative staphylococci.

The cases in this series all exhibited mixed infections with coagulase-negative and coagulase-positive staphylococci (see Table). In Cases 2, 3, and 5 the negative strain was the dominant and was cultured first in all three cases, whereas the positive strain was only occasionally cultured. In Case 4 the coagulase-positive strain was the dominant and was repeatedly cultured before the negative strain was isolated. The fact that mixed staphylococcal infections can occur was also noted by Resnekov (1959). He postulated that both organisms were present initially and that the coagulase-negative strains persisted because they were more resistant to antibiotic treatment. In three cases in this series, however, the coagulase-negative staphylococci were the first isolated, so that the full significance of mixed infection remains uncertain.

Summary

A new syndrome—persistent bacteraemia—occurring in cases of hydrocephalus treated by the insertion of a Spitz-Holter valve is described. It is due to colonization of the valve by organisms of relatively low virulence, and is characterized by persistent pyrexia, progressive anaemia, splenomegaly, and repeatedly positive blood cultures.

The coagulase-negative staphylococcus was the causal organism in three of the cases.

We are indebted to Mr. G. H. Macnab for his encouragement, help, and advice, and for permission to use the cases in this series; to the morbid-anatomy and the pathology departments for their help in the multitude of investigations and reports; to the department of medical illustration for the charts; and to the sister and staff of ward 6 C & D of The Hospital for Sick Children, Great Ormond Street, London, for their assistance with the cases.

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PARAESTHESIA OF THE HAND IN PREGNANCY

BY

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Interest in paraesthesia of the hand during pregnancy has increased in recent years, probably as a result of the recognition of the carpal-tunnel syndrome. Wilkinson (1960) has produced some evidence that during pregnancy compression of the median nerve in the carpal tunnel is due to excessive fluid retention, and McCallum (1959) and Wood (1959) have successfully treated this condition with oral diuretics.

An investigation has been made into the cause of sensory disturbances in the hand during pregnancy and their relationship to excessive fluid retention. Twenty-three patients who attended the antenatal clinics of Queen Charlotte's Hospital during 1959 and 1960 and who complained of symptoms in the hand were selected for the study. Four patients with cramps in the fingers alone were excluded from the series.

Clinical Findings

The time of onset of symptoms varied from the 20th to the 38th week of pregnancy, and in two patients with the carpal-tunnel syndrome the symptoms began in the puerperium. Pain, numbness, and tingling were the most frequent symptoms, and their most common site corresponded with the distribution of the sensory branches of the median nerve (Table I).

Site	No. of Patients
Median-nerve distribution	12
Four fingers ± thumb	10
Inside of forearm and little finger	1

A diagnosis of the carpal-tunnel syndrome was made in 12 patients; the symptoms involved the sensory distribution of the median nerve to the hand and fingers in all cases, and pain was referred to the forearm in seven of them. Only 2 of the 12 patients had symptoms relating to all the branches of the median nerve in the hand. Sensation in the fingers was diminished in five patients and weakness of the hand was present in two. Wasting of the thenar eminence was detected in one patient.

Ten patients had symptoms in the four fingers of one or both hands, the thumb also being affected in eight

of them. This syndrome differed from the carpal-tunnel syndrome in that the little finger was always involved; in addition, the symptoms were sometimes maximal in the little and ring fingers, and pain was referred to the forearm in only one. Sensation in the fingers was diminished in six, but none of the patients complained of weakness of the hand.

A comparison of the clinical features of the carpal-tunnel syndrome and the syndrome affecting the four fingers is shown in Table II. In all these patients, examination of the cervical spine and muscle reflexes of the arm revealed no abnormality. X-ray examination

TABLE II.—*Clinical Features of Both the Carpal-tunnel and the Four-finger Syndrome in Pregnancy*

	Carpal-tunnel Syndrome	Four-finger Syndrome
No. of cases	12	10
Average time of onset	31st week	28th week
Symptoms:		
Thumb	2	8
Index, middle, and ring fingers	12	10
Little finger	0	10
Forearm	7	1
Weakness of hand	2	0
Finger oedema	10	10
Associated symptoms in leg	5	8

of the cervical spine and thoracic outlet was normal in all except one patient who had a cervical rib on the right side and a carpal-tunnel syndrome in the left hand.

In addition to the sensory disturbance of the hand, approximately one-half of the patients (13/23) had symptoms in the leg; eight had cramps, three sciatica, and two meralgia paraesthetica.

Fluid Retention.—Oedema of the fingers was present in all the patients but two, one of whom developed a carpal-tunnel syndrome during the puerperium. The ankles were swollen in 14 patients; 10 of these had symptoms in the legs.

Although there is a wide variation in the gain in weight during normal pregnancy, Chesley (1944) estimated that the average gain during the second and third trimesters was 1 lb. (450 g.) per week. In 9 of the 13 patients who were weighed before the beginning of treatment, the average gain per week was excessive (Table III).

TABLE III.—*Average Weight Gain Per Week of 13 Patients with Either the Carpal-tunnel or the Four-finger Syndrome*

	Average Weight Gain in Pounds per Week							
	<0.5	0.5–	1–	1.5–	2–	2.5–	3–	3.5–3.9
No. of patients	0	1	3	6	2	0	0	1

Treatment

Because patients with sensory symptoms in the hand during pregnancy also had finger oedema, treatment with oral diuretics was tried. A double-blind trial of the oral diuretic hydrochlorothiazide was abandoned because of the persistence of severe symptoms in the first three patients taking the dummy tablets. Subsequently, all patients were given 50 mg. of hydrochlorothiazide ("hydrosaluric") twice a day for one week. Of the 21 patients receiving treatment, 19 were improved or cured (Table IV). In most of them the finger oedema and weight diminished. The failure of the dummy tablets in three patients and the association of fluid loss with the relief of symptoms during treatment with hydrochlorothiazide suggest that diuretics may be effective in patients with the carpal-tunnel and the four-

TABLE IV.—*Results of Hydrochlorothiazide Therapy in Patients with the Carpal-tunnel and Four-finger Syndrome*

Symptoms	Carpal-tunnel Syndrome	Four-finger Syndrome
Unchanged	2	0
Diminished	3	2
Cured	7	7

finger syndromes. In addition, if the symptoms recurred after cessation of therapy they were relieved by further treatment with hydrochlorothiazide.

Treatment failed in two patients; one had a carpal-tunnel syndrome during the puerperium with no finger oedema, and the other had gross finger oedema which hydrochlorothiazide did not reduce. Side-effects attributed to the drug were infrequent. One patient had a marked diuresis with a loss in weight of 7 lb. (3.2 kg.) in one week and a feeling of weakness; two other patients complained of vomiting while taking the drug. Although prolonged administration of hydrochlorothiazide was necessary to maintain symptom relief in several patients, they showed no clinical or biochemical evidence of potassium depletion.

Discussion

Sensory symptoms in the hand during pregnancy were most commonly due to the carpal-tunnel and the four-finger syndromes. The findings in the present series support the theory that fluid retention is the main factor producing the carpal-tunnel syndrome in pregnancy. However, cases that occur in the first trimester or puerperium are unlikely to be associated with fluid retention, and excessive or unaccustomed exercise may precipitate the onset of symptoms in these patients.

Sensory disturbance of the four fingers could be caused by a lesion of the digital nerves, the terminal parts of the median and ulnar nerves, or the median nerve alone. Although the median nerve may occasionally supply sensory branches to the little finger, it is unlikely to do this as often as symptoms occur in this digit during pregnancy. The absence of both motor involvement of the hand and referred pain to the forearm suggests that the symptoms are not due to a lesion of the terminal parts of the median and ulnar nerves. Loss of digital nerve function seems the most likely explanation of the sensory disturbance, but until further evidence of the cause of these symptoms is obtained the lesion may best be called "the four-finger syndrome." This syndrome is also associated with excessive fluid retention, which suggests that it may result from either intraneural oedema or nerve compression by swollen soft tissues. There was no clinical or radiological evidence of an abnormality of the cervical spine, the thoracic outlet, or the main peripheral nerves in these cases.

Summary

A study of 23 patients with paraesthesia of the hand in pregnancy is reported. The most common cause of these symptoms is the carpal-tunnel syndrome.

The other common cause of these symptoms is the four-finger syndrome. This differs from the carpal-tunnel syndrome and is probably due to loss of digital nerve function.

Approximately one-half of the patients also have symptoms in the leg.

Excessive fluid retention during pregnancy may precipitate the onset of symptoms in both the carpal-tunnel and the four-finger syndromes.

Hydrochlorothiazide was usually successful in relieving the symptoms.

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PROLONGED BLEEDING-TIME AND A.H.G. DEFICIENCY

A CASE TREATED WITH OESTROGENS

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It is now realized that the haemorrhagic diathesis characterized by a prolonged bleeding-time and a normal platelet count, and variously referred to as von Willebrand's syndrome, pseudohaemophilia, vascular haemophilia, and hereditary thrombopathy, represents a heterogeneous group of disorders. Haemostatic defects described in patients with this condition include abnormal capillary morphology and function (Macfarlane, 1941; Schulman *et al.*, 1955), antihaemophilic globulin (A.H.G.) deficiency (Alexander and Goldstein, 1953; Valberg and Brown, 1958), a deficiency of a haemostatic factor in the 1-0 fraction of plasma (Nilsson *et al.*, 1957), and a morphological or functional abnormality of platelets (Sussman *et al.*, 1952; Braunsteiner and Pakesch, 1956). The finding of the Bridge anticoagulant in the patient described adds yet another to the list.

Although haemorrhage in these patients is not usually serious, fatalities have been recorded (Buchanan and Leavell, 1956; Lavelle, 1957). No long-term treatment has yet proved effective in controlling the bleeding tendency. For this reason the following case of a severely affected patient is reported, as treatment with oestrogens appeared to prevent the onset of spontaneous bleeding.

Case Report

A 12-year-old girl was first admitted to hospital in 1950, when 18 months old, because of uncontrollable bleeding from a laceration of the lower lip. Her mother said the child had always tended to bruise easily. Pallor and numerous bruises on both legs were the only abnormal

findings noted on examination. Bleeding stopped after local haemostatic therapy and a transfusion of 1 pint (570 ml.) of stored blood.

She remained well until readmitted to hospital 14 months later because of profuse bleeding from the nasopharynx after an injury with the handle of a toy spade. Her haemoglobin was 5.5 g./100 ml. She was transfused with 2 pints (1,140 ml.) of fresh whole blood. Haematological investigations showed a bleeding-time in excess of 30 minutes, clotting-time 3½ minutes, platelet count 250,000/c.mm., and a positive capillary fragility test (see Table).

No further bleeding episodes occurred until October 13, 1952, when the child was readmitted to hospital in a shocked condition after a massive spontaneous haematemeses. Bleeding ceased after the transfusion of 3 pints (1.7 litres) of stored blood. Her haemoglobin after transfusion was 10.9 g./100 ml. As additional therapy she was given a five-weeks course of cortisone (100 mg./24 hours), starting on October 17, 1952.

Between this episode in October, 1952, and May, 1955, she was admitted to hospital on 19 occasions because of spontaneous haematemeses. On 13 of these the bleeding was severe enough to require treatment by blood transfusion (see Fig.); a total of 28 pints (15.9 litres) was given. Ecchymoses were always in evidence. She had no haemarthroses.

Between May 7, 1955, and January 21, 1956, the patient was free from bleeding episodes. During this period she was given a 13-weeks course of stilboestrol, 10 mg. daily, starting on July 14, 1955.

Severe haematemeses recurred in January, 1956, and during the next 12 months she was admitted to hospital nine times. On each occasion she required blood transfusions to correct the loss of blood and peripheral vascular collapse resulting from copious gastro-intestinal haemorrhage (see Fig.); 22 pints (12.5 litres) were given. At this time her condition gave rise to increasing concern not only because the haematemeses were becoming more severe but also because the setting-up of blood transfusions was becoming increasingly difficult. On January 11, 1957, she was restarted on oestrogens. Spontaneous haemorrhages ceased four weeks later and did not recur in the ensuing three

Summary of patient's hospital admissions and treatment.