hand, was much more common (77 per cent. of cases) before the age of 30.

6. There was a most striking difference between the mortality rates for the town (5.71 per cent.) and the county (15.4 per cent.). This was supported by the finding that only 3.84 per cent. of county patients, as opposed to 42.9 per cent. of town patients, received ante-natal supervision.

7. The total maternal mortality rate for this series was 9.84 per cent. This figure was doubled in illegitimate pregnancies.

8. The foetal mortality rate, including neo-natal loss, was 39.34 per cent.

I wish to record my thanks to the staff of Aberdeen Maternity Hospital for putting case-records at my disposal and to Professor Baird for his helpful suggestions.

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SPONTANEOUS HAEMATOMYELIA

BY

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Haematomyelia occurring without any history of injury in otherwise healthy subjects is very rare, and references to it in the literature are scanty. In a larger number of cases a history of slight direct or indirect injury to the spine is obtained, and although in many of them the injury may seem negligible in comparison with the severity of the symptoms, it is not justifiable to include these with the cases of truly spontaneous haematomyelia.

Cases in the Literature

C. Doerr (1906-7) was able to collect only sixty-three cases in his full review of the condition, which comprised all the literature from 1808 to 1904. In thirty-three of these cases no aetiological factors were mentioned, and of the remainder a convincing explanation in the light of modern pathology was available in only three cases. One was said to be due to syphilis, and in another military aneurysms of the cord were found at necropsy. In the third case the haematomyelia followed an earlier apoplexy in a man aged 70. J. Lépine (1900), in a review of forty-five cases, suggested that in many instances "fragility" of the spinal blood vessels was present, apart from such vascular abnormalities as aneurysm or arteriosclerosis; but he is cautious in his conclusions, and makes no definite suggestions as to the nature of the fragility. Chevallier and Desoille (1930) discuss six cases of spontaneous haematomyelia in young subjects, five of which came to necropsy. In three of them aneurysmal dilatations of the

vessels of the cord were found (one is also included in the reviews of Doerr and of Lépine—that of Liouville, *Soc. de Biologie*, 1872). Of the other two cases one was in a child, aged 2, in whom an endarteritis with thrombosis of the spinal vessels was found, probably due to syphilis. The remaining case showed a generalized hyaline degeneration of the arteries of the central nervous system. Chevallier and Desoille suggest that the most frequent cause of spontaneous haematomyelia in young subjects is congenital syphilis; but apart from the child aged 2 none of the cases they discuss affords very convincing evidence of syphilitic infection. On the available evidence it seems more reasonable to follow the suggestion of Lépine and suppose that a vascular fragility in the nature of a congenital haemangioma or aneurysm is responsible for the majority of cases, at any rate in young subjects in whom there is no evidence of systemic or arterial disease. In Doerr's sixty-three cases the incidence is much higher in young subjects than in old ones, as will be seen from the following figures:

Age 0—10	..	1 case	Age 41—50	..	4 cases
11—20	..	11 cases	51—60	..	2 "
21—30	..	22 "	61—70	..	6 "
31—40	..	12 "			

In five cases the age was not given, but 79 per cent. of the above occurred under the age of 40, and, so far as can be made out from the review, most of the subjects had previously been healthy.

Haemangiomatous malformations of the spinal vessels occasionally give rise to symptoms of spinal compression, and they are not uncommonly encountered in neurosurgical clinics when laminectomy is performed. Spontaneous rupture of these haemangiomata is, however, a very rare occurrence. Cases have been recorded by Ohlmacher (1899), Lissowsky (1933), Buckley (1936), and Richardson (1937), the clinical features of which resembled the one recorded below, and in which the haemangioma was definitely demonstrated at necropsy. Richardson also describes a case due to syphilitic endarteritis of the spinal vessels.

Aneurysms of the spinal vessels are very rare, but they have been described in association with coarctation of the aorta, and are occasionally found in syphilis and periarteritis nodosa. In comparison with the congenital "berry" aneurysms of the circle of Willis they are practically unknown.

The Clinical Syndrome of Spontaneous Haematomyelia

The onset of paraplegia is nearly always sudden, and paralysis is usually complete within a few minutes. It may accompany a slight exertion, but often there is no history of this. Severe lancinating pain, often of a "girdle" distribution, occurs at and above the level of the lesion, and there is a more or less complete loss of sensation below the level of the haemorrhage, depending upon its size. The pain persists for several days afterwards, and if the haemorrhage extends may change in level and severity.

Apart from injury there is probably no lesion of the cord in which the symptoms develop as suddenly as in haematomyelia. In Doerr's collection of sixty-three cases the onset was sudden in fifty-five, and pain was a prominent feature in thirty-six. The paraplegia is flaccid at first, and the deep reflexes are usually lost owing to the "spinal shock," but an extensor plantar response may sometimes be obtained. In the case to be described the plantar responses remained flexor for a considerable time.

The haemorrhage usually occurs into the central grey matter of the cord, and the sensory changes may resemble those of syringomyelia in cases where the haemorrhage does not extend into the lateral and posterior columns, but it is more common to find a very extensive loss of all forms of sensation in the early stages owing to the "spinal shock" and oedema. Sphincter control is generally lost, and there is complete retention of urine and faeces.

Considerable improvement occurs in patients who survive the initial stages. The spinal shock wears off and the oedema of the cord subsides, with a gradual return of sensation and motor power. In favourable cases there may be little residue beyond a segmental band of anaesthesia, but if the white matter of the lateral and posterior columns has been damaged there will be a much more extensive sensory loss, with spastic paraplegia and perhaps permanent loss of sphincter control. If the grey matter of the anterior horns is damaged, muscular atrophies are a sequel. Death in the early stages is usually due to respiratory paralysis as a result of the upward extension of the haemorrhage involving the cervical cord and origin of the phrenic nerves. It may occur later from urinary or other sepsis complicating the paraplegia.

The case described below presents most of the typical features of spontaneous haematomyelia. Death from respiratory paralysis was averted by the use of a Drinker's respirator, and the symptoms were considerably relieved by repeated lumbar puncture.

Case Record

A girl aged 15 was sent into the Staffordshire General Infirmary on March 19, 1937, by Dr. McGeough. The evening before admission she was engaged in household duties when she was seized with sudden severe pain in the back and legs. The legs rapidly became weak, and she had to sit down. Soon afterwards she found that her legs were completely paralysed and numb, and she was unable to pass urine. The site of greatest intensity of the pain was in the mid-dorsal region, and it had a lancinating character like "knife-stabs" shooting round to the front of the chest and abdomen.

On admission to hospital there was a complete flaccid paraplegia, with loss of all sensation except deep pressure up to the fifth dorsal level. Immediately above this there was a narrow zone of hyperaesthesia; above that sensation was normal. The left pupil was larger than the right, but both reacted normally to light and accommodation. The cranial nerves showed no abnormality. The abdominal reflexes and all the tendon reflexes of the lower limbs were absent, but the plantar responses were present, and were flexor. There was complete retention of urine, and the bladder was distended up to the umbilical level. No history of any recent or previous illness or of any injury or undue exertion could be obtained, and before the onset of paralysis there had not been even slight symptoms referable to the nervous system. Radiographs of the dorsal and lumbar vertebral column showed no abnormality.

On the first day in hospital lumbar puncture revealed a deeply blood-stained fluid under a pressure of 290 mm. There was no spinal block. The protein content of the fluid was 360 mg. per 100 c.cm., and the supernatant fluid was not yellow in the first specimen. The Wassermann reaction was negative in the blood and the cerebrospinal fluid. On the second day the pain in the back was still severe, and the cerebrospinal fluid was still deeply blood-stained and under a pressure of 250 mm. On the third day the amount of blood in the cerebrospinal fluid was less and the pressure had fallen to 200 mm., but the level of sensory loss was found to be rising, and some respiratory distress became evident.

On the fourth day there was complete loss of all forms of sensation below the second dorsal level, with severe headache and neck rigidity, suggesting that blood had reached the posterior fossa. Respiratory distress and cyanosis were much

more evident, and movements of both chest wall and diaphragm were feeble. The cerebrospinal fluid pressure had fallen to 150 mm., and the blood content was very much less. The patient was put in a Drinker's respirator, and artificial respiration was kept up almost continuously for the next ten days, when it was found that the sensory level had descended to the fifth dorsal segment and breathing was possible without distress or cyanosis. The cerebrospinal fluid was then slightly blood-stained and yellow, and was under a pressure of 120 mm. The paraplegia and complete sensory loss continued for many weeks. Some automatic bladder function appeared after about the fourth week, but up to that time there was complete retention. There was likewise retention of faeces, and rectal washouts had to be given.

By May 12 a good deal of recovery had taken place, and the upper limit of sensory loss had descended to the ninth dorsal segment. Deep pressure and vibration sense were present below this level, and pin-prick and light touch could be felt, but they gave rise to unpleasant sensations of the "thalamic" type. Temperature discrimination was poor. There was a constant feeling of "pins and needles" in the lower legs. Some motor power had returned, toe-wriggling and flexion and extension of both ankles could be performed, and the right knee could be flexed and extended. Both legs were very spastic, and the tendon reflexes were grossly exaggerated, knee and ankle clonus being easily obtained. The plantar responses had become extensor. No sphincter control had yet returned. The cerebrospinal fluid was normal.

The patient was seen again on February 12, 1938. She is now able to walk, although with difficulty. Both legs are very spastic, with bilateral extensor responses and knee and ankle clonus. There is no appreciable impairment of any type of sensation, even of segmental character, and there is only an occasional slight impairment of voluntary control of the bladder. Apart from her spastic paraplegia the patient is perfectly well.

The most probable explanation of the aetiology in this case is spontaneous rupture of a spinal haemangioma, and from the evidence which can be obtained from the available literature it is reasonable to suppose that most cases of spontaneous haematomyelia in young subjects are due to this cause. It is possible that a few cases may be due to rupture of aneurysms, but aneurysms of the spinal vessels, unlike those of cerebral vessels, are very rarely encountered, either in the post-mortem room or at operation. In older subjects syphilis of the spinal vessels may be a factor in determining their rupture, but there is little evidence that it is of common occurrence.

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The first congress of the International Society of Cosmobiology will be held at Nice from June 2 to 6 (Whitsuntide). This congress was brought into being by the Medical Society of Climatology and Health of the Mediterranean Coast, with the aid of the International Association for the Study of Solar, Terrestrial, and Cosmic Radiations. On June 4 and 5 the meetings will be continued in Monaco. There will be various scientific and social excursions during the congress, the programme of which includes discussions of astrophysics, the conductivity and ionization of the air and their effects on human beings, and the value of climatology in medicine and botany. Requests for a detailed programme should be addressed to the President of the Medical Society of the Mediterranean Coast, Dr. M. Faure, Rue Verdi 24, Nice. At the end of the congress there will be an excursion to Corsica.