

Infantile Hydrocephalus

Enlargement of the infant's head resulting from the accumulation of cerebrospinal fluid within it was recognized in ancient Greece. Nevertheless, the understanding of its aetiology was delayed for almost 2,500 years, and became possible only after the production and circulation of the cerebrospinal fluid was demonstrated in 1913 by W. E. Dandy and K. D. Blackfan.¹ It was then realized that it was obstruction to the circulation of fluid which led to its accumulation. An obstruction at or about the foramina in the roof of the fourth ventricle caused a non-communicating hydrocephalus, whereas one in the subarachnoid space at the tentorial opening produced a communicating hydrocephalus. Tests were devised to distinguish these two different types, and, appropriately led by Dandy, many neurosurgeons began to think about how to treat them.

Early attempts at treating non-communicating hydrocephalus aimed at restoring the continuity of the ventricular and subarachnoid spaces. This was achieved either by ventriculostomy (opening of the third ventricle into the interpeduncular cistern) or by a shunt between a lateral ventricle and the cisterna magna through a catheter.² In older children the latter operation has been of particularly great value in treating hydrocephalus, but in infants the results of both operations have been disappointing, probably because in the absence of circulating cerebrospinal fluid the subarachnoid space develops imperfectly. In the treatment of communicating hydrocephalus the early workers faced a more difficult problem, since there was no means of restoring the subarachnoid space or of short-circuiting the obstruction in it at the tentorial opening. Though a few cases were benefited by excising the choroid plexuses of the lateral ventricles, attention was concentrated on procedures which diverted the cerebrospinal fluid to areas where it could be absorbed (thecaperitoneal or theca-pleural anastomoses), excreted (thecoureteral anastomosis), or discharged on to a body surface (ventriculo-mastoid shunt). In particular, the diversion of fluid to the peritoneal cavity was found to be a definite advance.

The need for a physiologically sound and technically simple operation for these infants was satisfied with the introduction of a non-return valve, through which the ventricular fluid could be shunted into the venous system. The Spitz-Holter valve, introduced in 1951, has been followed by several others, and these are now used to maintain a shunt between one of the lateral ventricles and the right atrium. Small children tolerate these operations very well, and since the procedures are technically straightforward they are widely performed, not only by neurosurgeons but also by those without special training. Nevertheless, a number of problems remain to be solved, as is shown in a recent review by J. Lorber and R. B. Zachary. These workers reviewed 28 children seven to eight years after the operation and found that five of them had died, four from causes directly related to the hydrocephalus; 13 children were apparently normal, though four had large heads; eight had neurological defects of some severity and a further four with such defects showed intellectual impairment as well. Subsequent surgical procedures were frequently necessary; thus 23 of the 28 patients have required one or more revisions of the shunt over a period of six years. Infec-

tion related to the valve necessitated its removal in six cases.

Early diagnosis, the prevention of infection, and a method of overcoming the progressive shortening and eventual inadequacy of the cardiac catheter as growth proceeds will bring improved results. Nevertheless, even now the advances in the treatment of infantile hydrocephalus have been considerable.

Miliary Tuberculosis in the Elderly

Tuberculosis in Britain is now mainly a disease of the middle-aged and elderly. The pulmonary infection in old persons is readily diagnosed by chest radiography and sputum tests. In contrast miliary tuberculosis in the elderly is difficult to diagnose. It may result in a fatal illness which remains unidentified in spite of investigation, being discovered only at necropsy.¹ This is a tragic error, since antituberculosis drug therapy results in rapid cure.

Classical miliary tuberculosis is usually easily diagnosed in patients with miliary mottling on the chest radiograph, choroidal tubercles, and a positive tuberculin test. Diagnosis is readily confirmed by the presence of tubercle bacilli in cultures of sputum, urine, or cerebrospinal fluid. At page 273 of this week's *B.M.J.* Dr. A. T. Proudfoot and his colleagues draw attention to the fact that in elderly patients these characteristic features of generalized tuberculosis are commonly absent. This type of disease they term cryptic miliary tuberculosis. It occurred as commonly as the classical disease in patients over the age of 60 in this study. Their 16 patients presented with a severe systemic illness, insidious in onset and progress, in which general malaise, wasting, and fever occurred. Miliary mottling was absent in chest radiographs except for one patient, choroidal tubercles were not seen, and tuberculin tests were sometimes negative. Cryptic disseminated tuberculosis must therefore be considered as a possible cause of prolonged pyrexia of unknown origin or obscure wasting in an elderly person.

It should also be suspected in patients with an obscure pancytopenia or leukaemoid reaction, since disseminated tuberculosis is sometimes associated with bizarre blood pictures. In such cases the histology of the tuberculous lesions may be peculiar in that it is of a non-reactive type. The tubercles show discrete necrosis with little or no cellular reaction, and very large numbers of bacilli are present.²

Once tuberculosis is suspected the problem of confirming the diagnosis remains. Biopsy of various tissues may be helpful. Enlarged lymph nodes should be sought, since biopsy from one of them may be informative. The presence of a pleural effusion is an indication for needle biopsy of the pleura. Liver biopsy may show typical tubercles, and has been reported to have been positive in a high proportion of patients with miliary tuberculosis, as has histological examination of the bone marrow for acid-fast bacilli. The most valuable diagnostic test of all is, according to Proudfoot and his colleagues, a therapeutic trial of isoniazid with para-aminosalicylic acid (P.A.S.). In six of ten patients with cryptic miliary tuberculosis the temperature returned to normal within one week. Isoniazid and P.A.S. act only on mycobacteria, and therefore remission of fever is evidence of a mycobacterial infection. Streptomycin should not be

¹ Dandy, W. E., and Blackfan, K. D., *Journal of the American Medical Association*, 1913, **61**, 2216.

² Torkildsen, A., *Acta Chirurgica Scandinavica*, 1939, **82**, 117.

³ Lorber, J., and Zachary, R. B., *Archives of Disease in Childhood*, 1968, **43**, 516.

¹ Treip, C., and Meyers, D., *Lancet*, 1959, **1**, 164.

² Oswald, N. C., *British Medical Journal*, 1963, **2**, 1489