cranial birth trauma have been used, and the value of distinguishing such cases from the intra-partum asphyxia group is stressed. A diagnosis of prematurity or previability is considered undesirable, and was made in only 2% of the present series.

The clinical associations of each category are enumerated, and the aetiology is discussed. In most cases there was a specific association between a given pathological group or groups and at least one feature of pregnancy or labour. Thus, the classification is not merely academic, but should also be of practical value to the obstetrician and paediatrician. It is felt that the general adoption of such a system throughout the country would assist the collation of valid statistics on the causes of perinatal mortality.

In addition to the classification of death, certain factors in pregnancy and labour have been re-examined in order to determine in what way and at which stage they cause foetal and neonatal loss.

Finally, a study has been made of some clinical aspects of babies dying in the first week of life. The pulmonary syndrome of the newborn, birth trauma, pneumonia, and intraventricular haemorrhage, which together caused two-thirds of the neonatal deaths, could not usually be distinguished during life. Successful prophylaxis of pneumonia during the latter part of the period covered by this study is described.

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"English is now more widely used and studied throughout the world than it, or any other language, has ever been before. It has been estimated that over half of the literate population of the world speak English as a first or second language, or use English as an indispensable instrument for vocational purposes, or are studying (or have studied) English. It is increasingly the international language of science and technology. In recent years about half of the world's output of literature on scientific research has been published in English. To a degree hitherto unknown it is recognized, and not only in the Western world, as the language of opportunity, of affairs, and of international communication."—Annual Report (1955–6) of the British Council.

RELIEF OF NEUROLOGICAL SYMPTOMS AND SIGNS BY RECONSTRUCTION OF A STENOSED INTERNAL CAROTID ARTERY

BY

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In 1954 Eastcott, Pickering, and Rob reported the successful resection of an occluded segment of the internal carotid artery with reconstruction by a direct anastomosis between the common and internal carotid arteries. The patient, a woman now aged 69, is fit and well and has not suffered any further neurological symptoms. Since then the carotid arteries of 16 patients with various abnormalities have been operated on by the staff of the surgical unit at St. Mary's Hospital, London, with encouraging results. The object of this paper is to report the complete recovery of a 56-year-old man who before operation had definite pyramidal signs, was unable to write properly, and whose speech was slurred. The case reported in 1954 was, we believe, the first instance of successful reconstruction of an occluded internal carotid, and we also believe that the case recorded here is the first report of complete recovery of definite and persistent neurological signs due to internal carotid occlusion.

Clinical History

The patient, aged 56, was captain of a large ocean liner. In October, 1955, he felt a sudden lack of control of the right arm and leg, accompanied by tingling over the right side of his body which felt strange in a way he could not describe. He could walk during this episode and the symptoms cleared after about ten minutes. Two weeks later a second and similar attack occurred, lasting this time for less than five minutes, and two weeks after that his third attack occurred.

On January 23, 1956, five minutes after getting up from bed and while shaving, he suddenly lost control of his right arm and leg and found that his speech had become slurred. He could walk, but he staggered to the right; he was able to get back into bed. Neither in this nor in the three previous attacks did he suffer from impairment of consciousness or visual disturbance. He was transferred to the Royal Perth Hospital in Australia, where Dr. J. C. Anderson saw him and reported as follows: "On examination: slight cyanosis, pulse 100 a minute; right upper limb showed weakness of grip and of flexion but good power of extension. Right lower limb showed weakness of all movements with poor co-ordination in heel-to-toe test. Knee-jerks present, plantar response flexor. Tongue, no deviation. Eyes, pupils equal and react to light. Cardiovascular system, heart sounds muffled, blood pressure 150/80. Three hours later his speech was completely coherent and he was able to write clearly. All the cranial nerves appeared normal except for a dulling of sensation over the right cheek and forehead. Slight deviation of mouth to the right. Knee-jerks, right brisker than left. Plantar response flexor. Blood pressure 165/110."

Six hours later—that is, nine hours after his initial examination, Dr. Anderson reported: "Condition deteriorating.

Slurred speech, tongue protrudes to the right. Unable to write, but grip good. Unable to perform finger-to-nose test satisfactorily. Numbness of the right side of the face more marked. Weakness of right leg as noted at initial examination. Blood pressure 170/110."

He was then admitted to the neurosurgical unit of the Royal Perth Hospital, where the surgeon and physician in charge expressed the view that he was suffering from intermittent arterial occlusion as the cause of his symptoms. He was rested, and during the next 48 hours a steady and noticeable recovery in the power of his limbs took place, also in his ability to speak. As the weakness cleared he experienced a tingling sensation in the fingers of his right hand, particularly the middle finger, and touching this finger provoked a tingling sensation. This was a symptom that he had noticed before. A telephone discussion was held between Perth and Melbourne, where Dr. A. Schweiger expressed the opinion that the condition was probably a partial occlusion of the internal carotid artery. The patient was by this time so much better that it was thought advisable to return him to his home country before undertaking further investigations. He was accordingly flown home to England and was admitted to the Dreadnought Hospital under the care of one of us (C. E.).

On examination he showed evidence of difficulty in speaking fluently, and he complained that he could not write satisfactorily, and in particular that he found it difficult to sign his name and that his signature bore no resemblance to the normal. He also found difficulty in walking because he had not full control of his right leg. The right finger-to-nose test showed slight incoordination and there was impairment of skill in rapidly executed finger movements of the right hand. His gait showed a slight disturbance of rhythm due apparently to a minimal relative increase in tone of the muscles in the right leg, and the right knee-jerk was slightly brisker than the left. Rapid movements with the right foot were impaired.

The central nervous system was normal in response to all other routine tests, with flexor plantar responses and completely normal sensory responses everywhere. His blood pressure was 160/100. It was thought that the left internal carotid pulse was much decreased in volume when compared with the right, and it was difficult to feel at all. All the other peripheral pulses were normal. The cardiovascular system showed no other abnormality; there was no evidence of atherosclerosis elsewhere, his retinal vessels were normal in appearance, and his electrocardiogram showed nothing abnormal. Physical examination of his other systems revealed nothing abnormal.

The E.S.R. (Wintrobe) was 15 mm. in one hour. On lumbar puncture cerebrospinal fluid pressure was not raised and the fluid was of normal content, with protein of 28 mg. per 100 ml. and less than 1 cell per c.mm. The Wassermann and Kahn reactions were negative and the routine blood count was normal.

The patient was then transferred to the West End Hospital for Neurology and Neurosurgery, where an electroencephalogram showed a 10 c/s alpha rhythm disturbed in all leads by 22 c/s activity. There were runs of 5 c/s waves showing symmetrically over both temporal lobes and there was no evidence of any single focal abnormality. Plain skull *x*-ray films were normal and a left common carotid arteriogram was performed by Dr. A. Fisher; this was reported on by Dr. Douglas Gordon as follows: "Complete filling of both internal and external carotid vessels, but the branches of the latter were relatively large and of the former narrow, tortuous, and numerous. At the lowest point in the neck capable of being included, a small filling defect was seen partially blocking the internal carotid artery. There was a localized dilatation of the internal carotid artery immediately distal to the filling defect." The patient was then transferred to St. Mary's Hospital for operation by one of us (C. R.).

Operation

On March 21, 1956, the patient was anaesthetized and the body temperature reduced to 28° C. (82.4° F.) by surface cooling (Dr. Alan Cheatle). In our view hypothermia is a valuable aid to surgery of the carotid arteries; without it the prolonged clamping of these vessels which may be needed in this type of operation can produce permanent cerebral damage, but with hypothermia it is safe to occlude one carotid artery for a long period and the surgeon has adequate time to reconstruct the internal carotid artery. It is of course unnecessary to use hypothermia when a carotid artery is completely occluded before operation.

The bifurcation of the common carotid artery was exposed and the common, internal, and external carotid vessels were dissected free. A sufficient length of these vessels was freed to allow the application of clamps well away from the lesion. The constriction in the internal carotid artery could easily be felt and the artery at this point was adherent to the adjacent vein. The diseased segment of artery was resected; it consisted of a crescent-shaped plaque about 1 cm. long in the main axis of the internal carotid artery, and it projected into the lumen so that this was reduced to less than 20% of its normal calibre. The common, internal, and external carotid arteries were of normal appearance above and below this stenosed segment. Continuity was restored by a direct anastomosis between the common and internal carotid arteries; it was not necessary to ligate the external carotid artery. A satisfactory pulse returned to the internal and external carotid vessels and the wound was closed. Anticoagulants were not used.

Post-operatively the patient rapidly recovered consciousness and his body temperature reached 36.9° C. (98.5° F.) in five hours. At this time a superficial examination of his central nervous system showed no obvious abnormality. The next morning, 24 hours after the beginning of his operation, a full examination of his central nervous system was made and the findings were remarkable. The most striking thing was the fact that the patient had signed his name about fifty times on his morning paper in his joy at finding that he could write normally for the first time since the onset of his major symptoms two months before. And his pleasure at this, plus the usual euphoria seen after operations under hypothermia, produced an elation which can seldom have been equalled.

All the abnormal physical signs which had been present the day before had disappeared; his speech was as normal as was his handwriting. The right finger-to-nose test was normal and he was able to perform rapid fine movements with both his hands. The increased tone in the right leg had disappeared and his knee-jerk was now normal. He made satisfactory progress and left hospital ten days after the operation.

Five weeks later he was examined for his employers, the shipping company; he had no abnormal physical signs of any kind in his central nervous system and he did not complain of symptoms. His handwriting continued to be fluent and normal. He was certified as medically fit to resume charge of the liner he had captained, but his employers considered it unsound business to allow this when so many passengers and crew had known that he had had a "stroke." Accordingly he was promoted to a higher ranking shore-based administrative post in the company.

The pathologist's report (Dr. H. C. Barrett) on the portion of carotid artery was: "Part of the carotid artery in which there is a semilunar valve-like structure protruding into the lumen. Microscopically this is seen to be a hyaline thickening of the intima. The two recesses on either side of this membrane have been the site of both an old and a recent haemorrhage. Although there are a few small collections of round cells, mainly in the media, this structure is probably not inflammatory. It is consistent with a post-traumatic lesion."

The electroencephalogram was repeated on October 3 and showed improvement. The 5 c/s waves were no longer present and the 22 c/s activity was limited to the anterior halves of the hemispheres.

Discussion

The first point of interest is the lesion in this artery. This was considered by the pathologist to be traumatic in origin, but there was no history of injury. One of us (C. R.) believes that this lesion was a localized plaque of atheroma, both because of its appearance and because of its situation at the common site near to the origin of the internal carotid artery.

The next and most striking finding was the immediate disappearance of well-marked pyramidal signs and symptoms once a normal flow through the internal carotid artery had been re-established. The explanation of this and of the temporary episodes of disturbance of function in the central nervous system which occurs in patients with a partial occlusion of the internal carotid artery is of interest. In our view the most likely explanation is that the narrowing of the lumen reduces the internal carotid blood flow. In our patient this, coupled with a greater reduction of flow due to haemorrhage into the arterial wall at the time of the onset of his major attack, was enough to maintain the symptoms and signs of pyramidal insufficiency but not enough to cause complete death of the cerebral cells.

The same type of explanation will account for the transitory attacks which occurred earlier in this patient, in the patient reported by Eastcott *et al.* (1954), and in those reported by other authors, including Chambers (1954) and Millikan and Siekert (1955). In these the narrowing of the carotid reduces the flow. Under ideal conditions this is sufficient to maintain normal cerebral function, but when the flow is further reduced by such events as a change of posture or a reduction of blood pressure transitory symptoms of cerebral ischaemia may result. Others have postulated that these attacks of transitory carotid ischaemia are due to spasm of the carotid vessels. It is possible that this may occur, but in the presence of an organic reduction in the size of the internal carotid artery a further reduction in flow by some general or local cause other than spasm is more likely. Another explanation is that thrombi may form on the narrowed part and peripheral emboli result, but this again is unlikely in view of the short duration and repeated occurrence of similar attacks.

We believe that the correct treatment of a patient with a partial occlusion of the internal carotid artery is surgical because of the disability it causes and because of the great risk of complete carotid occlusion; this view is shared by Denman, Ehni, and Duty (1955). By this means we have completely relieved three patients, greatly improved two others, and six patients with complete occlusions have been made no worse by exploration of this vessel; there has been no mortality. The alternative is to treat these patients with long-term anticoagulant therapy. We believe that this measure should be used after operation to reduce, if possible, the occurrence of further thrombosis in this vessel or elsewhere.

An important step in the diagnosis of this lesion is the correct interpretation of the carotid arteriogram. This should always show the bifurcation of the common carotid artery, and as much attention should be paid to this region as to the intracranial vessels.

The actual operation is aimed at restoring the flow through the internal carotid artery. This may be achieved by either a direct anastomosis, a thrombo-endarterectomy, or an arterial graft or transplant, depending on the type of abnormality which the surgeon encounters. We have employed each of these procedures with success in patients requiring reconstruction of the carotid arteries. In our view hypothermia is a valuable aid to this type of surgery, but the body temperature need not be reduced below 28° C. (oesophageal temperature).

Summary

The case of a man with a partial occlusion of the left internal carotid artery is reported; as a result he was unable to sign his name, suffered from difficulty in speaking, and had abnormal pyramidal signs and symptoms in his right upper and lower limbs. These neurological abnormalities had been present for eight weeks. Reconstruction of the internal carotid artery was followed by immediate and complete relief of his neurological abnormalities. We believe that this is the first report of the complete recovery of definite and persistent neurological symptoms and signs due to internal carotid obstruction. In 1954 a similar case was reported by Eastcott, Pickering, and Rob, but in this case the neurological abnormalities were intermittent and not persistent.

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TREATMENT OF ULCERATIVE COLITIS WITH LOCAL HYDROCORTISONE

BY

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A number of reports exist indicating that oral cortisone is a useful agent in the treatment of ulcerative colitis. In a controlled therapeutic trial carried out through the co-operation of many physicians, it was found that patients treated with oral cortisone were nearly three times as likely to be in clinical remission at the end of six weeks' treatment as patients in the control group (Truelove and Witts, 1955). In view of the fact that cortisone and, more particularly, hydrocortisone have been found useful when applied locally in several eye conditions, joint conditions, and skin diseases, it seemed worth while assessing the value of local treatment in ulcerative colitis.

Hydrocortisone is an active principle of the adrenal cortex and is the principal corticosteroid found in human plasma. Under ordinary conditions it is present in the blood and other body fluids at a concentration of about 5–10 μg. per 100 ml. Under conditions of stress, or following injection of corticotrophin, its concentration may rise to 50 μg. per 100 ml., or even higher. Hydrocortisone appears to act directly on the tissues of the body, where it is constantly being broken down into inert metabolites. When cortisone is given orally or by injection it acts because it is converted into hydrocortisone. For cortisone to be locally effective the appropriate enzyme for this conversion must be present in the tissues being treated. For local application hydrocortisone has the additional advantage over cortisone that it is water-soluble, though not to a high degree. (The foregoing paragraph is based on the findings presented in a number of scientific papers, such as those by Nelson *et al.* (1951), Nelson and Samuels (1952), Cote and Delbarre (1953), Hellman *et al.* (1954), Silber and Porter (1954), and Peterson *et al.* (1955). A good general account is included in an article by Cope (1955).)