remained tortuous and dilated although their diameter had decreased from 1.5 to 1.3 cm., indicating a reduction of cross-sectional area by 25%. Successful obliteration of both fistulae was demonstrated, although some relative narrowing of the dilated femoral artery was observed at the site of the repair. A good flow was evident below this. At the site of the obliterated posterior tibial fistula an adequate collateral circulation was shown (Fig. 3).

COMMENT

Multiple traumatic arteriovenous fistulae in a limb are rare, while it must be unique for the onset of symptoms to be delayed as long as in the present case. This delay was advantageous in that a good collateral circulation had developed, but against this must be set the definite disadvantage that some permanent damage to the venous system of the limb had occurred, producing deficiency of the venous valves and varicosities. Fortunately no cardiac enlargement had developed.

Arteriography was invaluable not only as a means of locating the fistulae but because it gave accurate and precise information on the size of the fistula and adjacent connexions. The rapidity of flow through the fistula and vein often prevents satisfactory delineation of the defect. In this case the successful arteriograms were obtained by taking a rapid series of films of the whole limb at intervals of 1/3 second, it being important to begin taking the films at the commencement of the injection of opaque medium and to continue the series during the injection phase.

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Palmar-arch Thrombosis

The arterial anastomoses in the palm are so free that obstruction of one of the main vessels does not normally produce any appreciable impairment of the circulation in the fingers. Jackson (1954) records a case of traumatic thrombosis of the ulnar artery in the palm causing ischaemia of the middle finger, and quotes two previous similar reports; in all three the symptoms were relieved by resection of the thrombosed arterial segment. These seem to be the only instances of this condition appearing in the literature, though Cameron (1954) has a case of similar but more acute symptoms arising spontaneously and being relieved by division of the volar carpal ligament.

CASE REPORT

A builder's labourer aged 60 used the common practice in the trade of catching bricks, tossed from one worker to another, in the left hand. Six weeks prior to being seen he developed pain and numbness in all the fingers of that hand but not in the thumb. The symptoms became gradually more severe; the fingers felt swollen and the pain became intense, particularly at night. It was slightly improved by elevating the hand in a sling.

On examination the tips of all the fingers in the left hand were pale and slightly cyanotic, the pallor extending to the proximal interphalangeal joints. The fingers were cold and were hypersensitive to light touch, pressure causing intense pain. The pulp of the middle finger was indurated. The colour and sensation in the thumb were normal. The radial pulse was present, and the ulnar artery could also be felt pulsating at the wrist. The vessels were thickened and the blood pressure was 240/120. There were no other abnormal cardiovascular or neurological findings.

Anticoagulant therapy was started with phenindione 100 mg. b.d. on the first day followed by 50 mg. b.d. The prothrombin time was increased from 20 seconds to 30 seconds and being maintained at this level without any relief of the symptoms. The cervico-dorsal sympathetic chain was then injected with lignocaine, producing a Horner's syndrome and the following rises in skin temperature after 30 minutes: index finger, 28.6 to 31.4° C.; middle finger, 27.4 to 31.0° C.; and ring finger, 24.2 to 28.6° C. This relieved the pain and sensation of numbness in the index and ring fingers temporarily but did not affect the subjective symptoms in the middle finger.

After a week the hand had relapsed to its original condition; all four fingers were painful, pale, cold, and hyperaesthetic, the middle finger being the most severely affected. The phenindione was therefore discontinued and the ulnar artery was explored. A small firm bluish swelling of the artery was found just proximal to the origin of the digital branch to the ulnar side of the little finger; it did not transmit the pulse. The swelling was excised between ligatures and sent for section. The strength of pulsation in the proximal end of the artery increased immediately.

On recovery from the anaesthetic the pain in the hand was completely relieved. The fingers were all normally warm and pink though the pulps of the middle and ring fingers were still tender. A week later only the indurated pulp of the middle finger caused discomfort; a fortnight after this the induration had almost completely resolved, there was no pain, and the circulation in all the digits was normal.

Pathological Report: "Section of ulnar artery shows successive waves of thrombosis gradually occluding the artery. The early thrombi have undergone organization with considerable small-channel revascularization."

COMMENT

The hands of manual workers are exposed to often-recurring minor trauma for long periods; it is surprising that thrombosis of the palmar vessels is not encountered more often. It may be that the condition is not recognized, the symptoms being ascribed to vasomotor disorders arising around the thoracic outlet; or it may be that it occurs without any but mild transient symptoms because of the development of an adequate collateral circulation. The failure of this development in the presence of numerous anastomoses is remarkable and can only be attributed to reflex spasm. This would appear to be confirmed by the dramatic response to excision of the local lesion, though the simple operative decompression of the palmar circulation may also have had a beneficial effect. The result of the sympathetic block suggests that a cervico-dorsal sympathectomy might be effective, but it is a more severe procedure with less certain results. Resection of a coincident cervical rib or fibrous band would clearly be useless.

It is important to recognize the true nature of the vascular disease so that the patient is not subjected to unnecessary major operations in the root of the neck when a comparatively minor procedure in the hand is all that is required. The failure of conservative measures reported by previous observers has been confirmed in this case, so that delay in resorting to operative treatment appears to be unjustified.

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