

PAIN IN THE ARM: A SYMPTOM OF HEART DISEASE

By WALTER SOMERVILLE, M.D., F.R.C.P.

Assistant Physician, Department of Cardiology, The Middlesex Hospital

Pain in the arm was mentioned in Heberden's first description of angina pectoris, '... sometimes there is joined (with the chest pain) a pain about the middle of the left arm . . .' (1772). Herrick (1912) also referred to arm pain in his first paper on coronary occlusion, the earliest in the English language. When the arm and chest pain of ischaemic heart disease occur at the same time, no diagnostic problem arises. But pain confined to one or both shoulders or arms may be misleading. Its real meaning may be missed even in well-informed circles. Not long ago, a professor in an eminent medical school died suddenly from what was shown at autopsy to be a cardiac infarction. For the previous few weeks, he had been having physiotherapy for pain in both shoulders and arms which came on only when he walked. The person with anginal pain mainly in the arms does not associate it with his heart and usually keeps his trouble to himself until he feels the pain in the chest also.

The typical sensation of angina pectoris or cardiac infarction has an easily-recognized quality. The terms *constricting*, *squeezing*, *gripping*, *vice-like*, *cramp-like* and *tight* are usually used by the patient. He often corrects the doctor who enquires about pain, saying the sensation is *pressure* or *tightness* rather than pain. Its position, too, is fairly standardized. The common sites are across the chest, or behind the sternum, but seldom under the left breast. The diagnosis of a pain or sensation with these two features of quality and site should never be in doubt. Radiation beyond the chest is common. The usual paths are in the left arm or both right and left arms, and upwards to the throat and along the jaws. Sometimes the pain passes to the upper abdomen or the back but this is unusual. The pain combining these characteristic features of quality, site and radiation leaves open no other diagnosis than ischaemic heart disease. The referred pain may trouble the patient more than the chest pain. He may go to his dentist because of toothache, or buy a radiant

heat lamp for his shoulder pain. A chauffeur may blame his forearm pain on heavy steering. Alert questioning in these cases may uncover a co-existing chest sensation and lead to the true cause.

Ischaemic pain in the arm is often described by the patient in similar terms to the typical chest pain. It is said to be *cramp-like*, *squeezing*, *a band around the arm* or like 'having my blood pressure taken.' The arms are often said to ache or feel heavy after a severe attack of angina pectoris.

The pain is usually felt on the ventral and medial surfaces of the arm and forearm. It may extend down to the little finger and the ring finger. The patient may demonstrate what he feels by gripping the forearm and then the upper arm, pointing out two areas with a gap between them. An elderly man with syphilitic angina would grip the ring finger of the left hand where his pain began and spread upwards to the shoulder, across the chest and down the right arm. Sweating localized to the arm or shoulder has been described but is very uncommon.

The Pain Pathways from the Heart

All the pathways of pain from the heart have not been precisely defined. The following facts, however, are generally accepted. Ischaemic pain arises in the heart muscle and passes along pain fibres situated in nerve plexuses in the adventitia of the coronary arteries. The pain impulses are carried in sympathetic nerves to the first to fourth thoracic sympathetic ganglia. From here, they pass into the corresponding segments of the cord (T. 1-4). These fibres, transmitting visceral pain from the heart, join with others bearing somatic pain impulses from the areas of the skin supplied by T. 1-4, that is the mid- and upper parts of the front of the chest and the medial aspect of the arm and forearm. The intimate relationship between these two sets of sensory nerves explains, according to the theory of referred pain, how sensations arising in the heart are perceived by the patient in the arms as well as the chest.

The Shoulder-Hand Syndrome

The shoulder-hand syndrome consists of pain, stiffness and limitation of movement of the shoulder, hand and fingers, and trophic changes in the skin and other tissues of the hand, following acute cardiac infarction. The complete picture is uncommon, occurring in less than 5 per cent. of infarctions. Some degree of stiffness of one or both shoulders develops in about 10 per cent. of patients within a month or six weeks of an acute infarction.

In the mildest form of the syndrome, the patient complains of slight pain or stiffness on moving the arm. Severe limitation of movement with pain shooting down the arm, upwards to the neck and down the side of the thorax on abduction and lateral rotation is known as a 'frozen shoulder.' In some cases the hand is warm and the fingers pulsate, reflecting vaso-dilation. These changes may be the forerunners of severe, if uncommon trophic changes, namely swelling of the fingers and hand, stretching of the skin with red-purple discoloration, trophic ulceration of the fingers or hand, and thickening and contracture of the palmar aponeurosis. The condition in any degree of severity except the slightest, may be very resistant to treatment and sometimes the results of months of painstaking physiotherapy may be disappointing. Occasionally, all stiffness and pain may disappear spontaneously within a few weeks.

The shoulder-hand syndrome has not been satisfactorily explained. The changes show a tendency to appear in joints which have been the seat of arthritis or peri-arthritis. The left arm is the more often affected but the right arm is involved when the ischaemic pain was right-sided. Protective disuse of the limb is responsible to some extent, but other factors are involved, too. One of these is a neurovascular reflex mechanism. Pain impulses arising from the heart, reflexly produce muscular spasm and neuro-vascular reactions in the ligaments, muscles and skin, innervated

by the eighth cervical to the fourth thoracic spinal segments.

Treatment

No special treatment is needed for the pain of acute infarction referred to the arm. The mild varieties of the shoulder-hand syndrome usually yield to passive and active shoulder and arm exercises. The more severe degrees are often long-lasting and resistant to treatment. If the infarction heals satisfactorily and pain does not recur, the shoulder stiffness may subside spontaneously in a few months. Sometimes it may still cause trouble after a year. In addition to physiotherapy the various measures used include procaine infiltration around the shoulder joint, steroid therapy, upper thoracic sympathetic block with procaine and stellate ganglionectomy. These points are considered fully in other parts of this symposium.

Summary

The typical chest pain of ischaemic heart disease (angina pectoris and cardiac infarction) is often transmitted to one or both shoulders and arms. Occasionally, it is felt first in the forearm or arm and spreads upwards to the shoulder and across the chest. Rarely, it may be confined to the arms. The correct diagnosis may be missed when the pain is dominantly in the arms or shoulders.

The shoulder-hand syndrome is an uncommon sequela of acute cardiac infarction. It consists of stiffness of the shoulder, and in its severe form, of great pain on moving the arm and trophic changes in the hand. The condition may respond only slowly to treatment, and may be troublesome for many months after an acute infarction.

BIBLIOGRAPHY

- HEBERDEN, W. (1772), *Med. Trans. Roy. Coll. Phys.*, **2**, 59.
HERRICK, J. B. (1912), *J. Amer. med. Ass.*, **59**, 2015.

References from page 404—H. Harold Friedman, M.D., Thomas G. Argyros, M.D., and Otto Steinbrocker, M.D.

REFERENCES

- ADSON, A. W., and COFFEY, J. R. (1927): 'Cervical rib, method of anterior approach for relief of symptoms by division of scalenus anticus,' *Ann. Surg.*, **85**, 839.
- BEYER, J. A., and WRIGHT, I. S. (1951): 'The hyper-abduction syndrome with special reference to its relationship to Raynaud's syndrome,' *Circulation (N.Y.)*, **4**, No. 2.
- EDEN, K. C. (1939): 'The vascular complications of cervical ribs and first thoracic rib abnormalities,' *Brit. J. Surg.*, **27**, 111.
- EDWARDS, E. A., and LEVINE, H. D. (1942): 'Auscultation in the diagnosis of compression of the subclavian artery,' *New Eng. J. Med.*, **247**, 79.
- FALCONER, M. A., and WEDDELL, G. (1943): 'Costoclavicular compression of the subclavian artery and vein,' *Lancet*, **245**, 539.
- FALCONER, M. A. (1947): 'The costoclavicular syndrome,' correspondence, *Brit. Med. J.*, July 12.
- FISKE, L. G. (1952): 'Brachial plexus irritation due to hypertrophied omohyoid muscle,' *J.A.M.A.*, **149**, 758.
- GAMBLE, S. G. (1951): 'Costoclavicular syndrome,' *Arch. phys. Med.*, August, 516-522.
- HAGGERT, G. E. (1948): 'Value of conservative management in cervicobrachial pain,' *J.A.M.A.*, **137**, 508-513.
- JUDOVICH, B., BATES, W., and DRAYTON, W., Jr. (1944): 'Pain in the shoulder and upper extremity due to scalenus anticus syndrome,' *Amer. J. Surg.*, **63**, No. 3, March.
- LORD, J. W., Jr., and ROSATI, L. M. (1958): 'Neurovascular compression syndromes of the upper extremity,' *Clin. Symp.*, **10**, No. 2, March-April.
- MURPHY, J. B. (1905): 'Cervical rib symptoms resembling subclavian aneurysm,' *Ann. Surg.*, **41**, 399.
- MURPHY, T. (1910): 'Brachial neuritis from pressure of the first rib,' *Aust. med. J.*, **15**, 582-585.

References continued on page 425