THROMBOSIS OF THE AXILLARY VEIN

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The remarkable condition of primary thrombosis of the axillary vein has been shown in recent years to be less rare than was previously supposed; it is possible also that many of the cases escape recognition.

Aetiology

Active young men suffer most, and the right arm is usually affected in right-handed people. Pearce Gould and Patey in 1928 reported eight cases, and in a review of the literature they referred to thirty-two others. The patients in these cases were between the ages of 20 and 40—except for a girl of 11 years (Rosenthal)—and most were between 20 and 30. Since the paper by Pearce Gould and Patey, Firth and Mackay have recorded a case in a girl of 19; after stirring a plum pudding her right arm became swollen, and eighteen months later thrombosis occurred in the left axillary vein. Taylor describes two cases in Cambridge rowing men, both aged 19. In most of the recorded cases the patient has experienced some slight trauma or has performed some unusual task, very often involving a series of sudden muscular efforts with the arm in full abduction. Examples of such muscular efforts have been: cleaning a ceiling, lifting heavy jars on to a high shelf, hanging curtain rods, and rowing in a race. Other recorded traumata have been: riding a restive horse, getting out of bunkers in a round of golf, lifting bales of cloth, and heavy work with a hammer.

There may be a history of some mild infective condition preceding the onset without evidence of previous trauma; such conditions have been a sore throat, an infected tooth or socket, a boil, or a septic abrasion of the hand on the affected side. It is a remarkable fact that in nearly every case the patient first notices that the arm is swollen on waking in the morning. It seems possible that there may be some other factor responsible for the onset of the thrombosis. Possibly pressure may be exerted upon the axillary vein during sleep, either by constriction of the vein by a "rucked up" pyjama sleeve or by lying in bed with the arm in an unusual position.

Trauma appears to be a very important aetiological factor, but the mechanism of the trauma is not completely understood. The injury follows exertion involving extreme abduction of the arm. For instance, at the end of a rowing stroke the clavicle is pulled downwards and backwards, the anterior scalene muscle, the subclavius muscle, and the costo-coracoid ligament causing pressure on the axillary vein. During extreme respiratory efforts the axillary vein becomes distended and liable to injury. Probably the fundamental lesion is a tear of the intima of the vein or a rupture of the subclavio-axillary valve. After such an injury organisms are carried in the blood stream from a distant infective focus and settle at the site of the injury, where a mild type of thrombophlebitis commences. Patey and Pearce Gould injected plaster-of-Paris into the axillary vein of the cadaver, and grooves were found on the vein in the region of the costo-coracoid ligament after extreme abduction of the arm.

Clinical Course and Treatment

The symptoms in various cases are often very similar. Usually the patient, on waking in the morning after some

unaccustomed exertion on the previous day, notices that his arm is swollen and blue. It feels stiff, but is not very painful. On examination the arm is oedematous and cyanosed, and dilated collateral veins are visible over the shoulder region. The axillary vein is palpable as a hard, tender cord, but the radial pulse is not affected. Special examinations may reveal some hidden infective focus in the teeth or throat. The oxygen content of the venous blood on the affected side is less than that on the opposite side. The skin temperature of the affected side is half to one degree lower than it is on the normal side.

Treatment is conservative. The patient is kept in bed with his arm raised on pillows, and pressure is applied to the limb by means of alternate layers of wool and flannel bandage. Septic foci are treated. At a later date, after the swelling has begun to subside and the acute condition has passed, massage and gentle exercises are useful to reduce the swelling. Operative intervention is dangerous; removal of the clot has been performed, but this procedure is unnecessary, and may result in pulmonary embolism.

The end-results are favourable. After two or three weeks' rest the swelling begins to subside. In six months the collateral circulation is established, and the patient in most cases is fit to resume his old activities.

Case Report

The patient was a welder and lorry driver, aged 20. Three days before admission to the General Infirmary at Leeds he woke up in the morning to find his right arm swollen and stiff; it was not painful. The swelling had neither increased nor decreased since he first noticed it. There was no history of an accident or of any unaccustomed exertion; he had had no sore throat and no other acute infective condition immediately preceding his illness.

On admission on December 11th, 1933, the patient was found to be a well-built man and to be in excellent general health; temperature, pulse, and respiration were normal. On the sixth day there was a slight rise of temperature (99°). Pyorrhoea alveolaris was marked, and pus could be squeezed from the sockets of the lower incisors. Examination of the throat revealed nothing abnormal, and no abrasion was detected on the right hand or forearm. At the level of the widest part of the biceps the circumference of the right arm measured three inches more than the left, while there was a difference of two inches in the circumference of the widest parts of the forearms. The patient was right-handed. Pitting was present but was not marked. The superficial veins were swollen over the shoulder and on both axillary folds, while the axillary vein was tender and could be palpated as a hard, solid cord. There was tenderness in the supra-clavicular fossa over the lower part of the right internal jugular vein. There was no difference in the two radial pulses. A culture of the pus from the gums produced a growth of *Streptococcus viridans* and staphylococci. A culture from the tonsils yielded a growth of Friedländer's pneumobacillus. The Wassermann reaction was negative. The blood count was as follows: total leucocytes, 9,000; haemoglobin, 86 per cent.; red blood cells, 5,290,000; and colour index, 0.81.

Treatment and Subsequent Progress

The patient was treated by rest in bed. The arm was elevated on pillows and was bandaged firmly with alternate layers of wool and flannel bandage. Calcium lactate was given by mouth. After six weeks gentle massage was applied to the arm. The patient was discharged from hospital seventeen days after admission; the condition of the right arm was much improved, but it was still more swollen than the left.

When he was seen ten months after the onset of the condition he was doing his old work without difficulty. The right arm was still larger than the left, and measured two inches more round the biceps and one inch more round the

widest part of the forearm. There was no pitting. The axillary vein was still palpable and cord-like. The superficial veins were more prominent on the right shoulder than on the left.

Summary

The aetiology of primary thrombosis of the axillary vein is discussed. One case is described, and in the appended bibliography twenty-three others are collected since the exhaustive study made in 1928 by Pearce Gould and Patey on eight of their own cases and on the thirty-one other cases reported in the literature previous to this. It is suggested that pressure on the axillary vein by constriction of a pyjama sleeve at night may cause the onset of the thrombosis in certain cases.

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ACETYLCHOLINE IN TOBACCO AMBLYOPIA

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In 1901 Parsons,¹ as a result of experimental work on rabbits, suggested that the defect in tobacco amblyopia was due in part to two causes: (1) constriction of the arterioles, which resulted in the starvation of the macular area, where the blood supply is poor; and (2) paralysis of the synapses in the cone fibres, or of the bipolars, or of both. For many years opinion favoured the degeneration of the nervous elements as the primary cause of the symptoms.² De Schweinitz stated: "The situation of the pathological process is in the optic nerve, and especially in that portion which is known as the papillo-macular bundle," but he added that the appearances were more like those of an interstitial sclerosing inflammation with secondary nerve atrophy than primary nerve atrophy with secondary interstitial change.

More recently some observers have inclined towards the opinion that the constriction of the arterioles from nicotine poisoning was the primary cause, and have based their therapeutic measures accordingly. In 1930 Pfimlin³ reported fifteen cases treated with sodium nitrite in isotonic sodium chloride solution injected intravenously, and 50 per cent. of the eyes obtained 20/30 vision in five and two-tenths weeks. In 1932 Duggan treated six cases with sodium nitrite intravenously, and eight out of twelve eyes obtained 20/30 in three to fourteen days.

In 1935 Duggan⁴ reported a series of twenty-four cases of toxic amblyopia due to excessive smoking, which he treated with a form of sodium nitrite known as nitroscleran, and reported marked improvement in the visual acuity, with corresponding reduction in the central scotoma. Twenty-one of these patients improved to 20/30 in eighteen and four-tenths days. Five of the patients actually continued smoking during treatment, but their average time of recovery to 20/30 was delayed to thirty-six days. Where the patients did not smoke recovery was completed in twelve days. These figures compare favourably with the older forms of treatment. Fuchs found the period before recovery in very mild cases to be from one to two months; Traquair cured mild cases in about six weeks, but reported that in severe cases two or three months might elapse before definite improvement began.

The following cases have been treated with acetylcholine, and this note is published so that other observers may try it and report results. The condition is becoming less frequent, and to wait for a larger number of cases

may deprive many patients in other places of the advantages of this method. All the patients were advised to stop smoking, but abstinence was not complete.

A gate porter aged 63 attended the out-patient department of a hospital on October 24th, 1934, complaining of failing vision. The right vision was 1/60, with correcting glasses 6/60; the left vision was 1/60, c. gl. 6/60. He was treated with potassium iodide until November, 1934, when he stopped attending since he had made no improvement.

I saw him through the National Eye Service on July 15th, 1935, and diagnosed tobacco amblyopia. Vision was then with glasses 1/60 in each eye, with total loss of colour vision; 0.1 gram dose of acetylcholine was injected intramuscularly, and the patient was admitted to hospital on the following day, when the vision had improved to 4/60 in each eye. He was given intramuscularly 0.1 gram of acetylcholine (B.D.H.) daily, and after the third injection the vision with glasses was in the right eye 6/36 and in the left eye 6/24 L 1. On the 19th he was discharged with right vision 6/18 partly and left vision 6/18 partly. He attended daily for his injection, and resumed his work. On the fifth day he could recognize blue and yellow, but not red or green. On the tenth day the vision in each eye was 6/18, and this was maintained until August 13th, when the vision in each eye was c. gl. 6/12; he could identify red and green, and there was no sign of any scotoma. The acetylcholine was stopped, and he was given a mixture containing potassium iodide, potassium acetate, and sodium citrate, 5 grains of each to be taken three times daily. On August 27th the vision with glasses was 6/9 and J 1 in each eye, with perfect field of vision and colours.

A carpet weaver was seen by me through the National Eye Service on June 26th, 1935, complaining of failing vision for two years. The vision in each eye was 1/60. Both disks looked pale and atrophic, and there was a scotoma for all colours. He was given an injection of 0.2 gram of acetylcholine, and was admitted to hospital. On the 27th he received 1 c.cm. acecholin (Anglo-French Drug Co.), and the vision was then: right 6/36 (L 1) and left 6/18. The blood pressure was 160 mm. before the injection, and 140 mm. half an hour afterwards. The injection was repeated each day, and on July 2nd the vision was 6/12 in each eye. He was discharged on July 5th with vision 6/9 in each eye and a good colour response. He was given a mixture of potassium iodide with potassium acetate and sodium citrate, 5 grains of each to be taken three times daily, and attended at the out-patient department three days later for an injection. The vision in the right eye had dropped to 6/18, but the left remained at 6/9. Thereafter he had one injection each week, and admitted having had an occasional smoke. On July 30th he could see his wools at work, and the vision was: right 6/12 and left 6/6. Tested with Ishihara's test on September 24th, he showed some red-green blindness.

A man aged 60 was seen as an out-patient on July 23rd complaining of failing vision for a long time. The vision in each eye was 4/60. The blood pressure was 220/110. The right eye identified yellow only and the left eye saw it as