

ART. VI.—*Axillary Aneurism; Ligature of the right Subclavian Artery; Death from Hemorrhage on the sixty-second day.* By R. J. FARQUHARSON, M.D., of Davenport, Iowa.

CASE.—Joseph C., æt. 48, carpenter, Irish, married, of temperate habits, of a spare but muscular frame, consulted me March 16, 1876, in regard to a tumour of the right shoulder. Upon examination, a pulsating growth was found, occupying the right sub-clavicular space, and of the size of a hen's egg. Pulsation was distinctly felt in the tumour, which did not extend above the clavicle; no thrill anywhere perceptible; and pulsation was stopped by digital pressure over the first rib. Patient first noticed pain and numbness of right arm about Christmas, 1875, which symptoms he had attributed to rheumatism.

He assigned as a possible cause of the tumour, either working with an adze (an unusual tool with him), or lifting some heavy door frames, in the making of which he had been engaged the past summer.

As the tumour was quite small, the pulsation entirely controllable by pressure, and as the patient was very averse to any such operation as ligation of the artery, it was determined, in consultation with Dr. Peck and Dr. Cantwell (his family physician), to try milder means. At first, direct digital pressure was resorted to, and upon the very first trial an incident occurred which gave great hopes of final success. The patient was seated in a chair, and while the circulation was completely stopped by the pressure of the thumb, he complained of a sudden pain darting down the arm.

Upon immediate examination, I found the tumour full, firm, and without pulsation, as was also the artery at the wrist; I quieted the agitation and alarm of the patient, which were excessive, and keeping my hand on the tumour, remarked that the pulsation did not return for three or four minutes, and then very gradually, it being fully ten minutes before the full force of the pulsations was restored.

These symptoms indicated, almost without doubt, the formation of a clot, which was while yet soft, broken up and washed out by the returning circulation. I then thought had we been prepared for such an unexpected event, and been able to keep up the pressure, or had secured the more perfect formation of the clot by a bleeding from a large orifice, we might have cured the aneurism by less than ten minutes' pressure.

Direct digital pressure was kept up in a desultory and intermittent manner for several weeks, and then abandoned as useless, and insupportable to the patient.

A course of subcutaneous injections of ergotin was then tried, the following formula being used: R. Ergotin (Bonjean's or Squibb's), grs. xv; aquæ, ℥ lxxv; of this, 5 ℥ = 1 gr. ergotin, was injected at first; this was rapidly increased to 15 ℥ = 3 grs. ergotin, beyond which quantity it was deemed imprudent to go, owing to a very unpleasant feeling in the head, attended by an instant flushing of the face.

These injections were continued every other day, and then every third day for six or seven weeks; they were never used in the vicinity of the tumour, but in either arm; no local effect beyond the formation of a slight nodule at the site of the injection, or a slight bleeding, was ever noticed; there was no inflammation, no abscess, nor indeed any of those unpleas-

ant consequences so frequently noted as following the subentaneous use of ergotin. This I attribute to the omission of alcohol and glycerine from the formula.

I omitted to state that immediately after the commencement of digital pressure a thrill could be felt in the aneurism and its vicinity; this thrill was never afterwards entirely absent, though its strength and distinctness varied from time to time.

The general effect of the ergotin, after the full dose of 3 grs. was reached, was to diminish the calibre of the arteries, making the pulse smaller, and more cord-like; it also rendered the pulse slower, and after a while, it appeared, by lessening the impulse of the heart, to diminish the size of the aneurismal tumour, but it never increased its hardness, *i.e.*, there was shown no attempt at coagulation of the contained blood.

June 15. In consultation with Dr. Cantwell, it was determined to try ergotin, combined with indirect pressure.

The affected limb and shoulder, having been covered with a layer of cotton wadding, was enveloped in a bandage loosely applied, and rendered fixed or immovable by soluble glass; over the aneurismal tumour a hole was cut in this case or shell, a hollow India-rubber ball inserted, and pressure made by a few turns of a figure of 8 bandage about the shoulders. Enough pressure was made to affect the pulse somewhat, but not enough to cut off entirely the circulation, or to distress the patient too much.

This contrivance appeared to answer the purpose very well, as it controlled the circulation without stopping the return of blood by the veins; it appeared also to diminish the size of the tumour, and was not very painful. It was adjusted every two or three days, an injection of ergotin given, and was thus continued for more than a month; at this time, when it was removed entirely for the purpose of renewal, we were much disappointed to find that there had been no real diminution of the tumour; it was in fact only pushed up under the clavicle, out of the reach of the finger when applied through the hole in the outer casing. The patient now declared himself worn out and disgusted with all other treatment, and ready for the operation of ligation. But as the tumour was quite small, and there were no urgent symptoms, it was determined to defer the operation for a few weeks, until the advent of cooler weather.

This delay came near proving a fatal one, as the history of the case will show.

Leaving home on September 1, and returning on the 23d, I found the patient in the most perilous condition. The tumour was now as large as a cocoa-nut, extending from slightly above the clavicle down to the armpit; the whole arm was swollen; the skin tense and shining over the tumour; pulse 100 in each wrist, with some thrill in the right. Patient had a haggard countenance, and suffered so much pain as to be unable to sleep. A cough with which he had been afflicted for years, was now very troublesome and dangerous, as rupture of the distended aneurism was threatened at each recurring paroxysm. Tr. neonite, \mathfrak{m} 5, q. h. 4, with tr. opii at night were ordered; this quieted the circulation, and afforded the patient two or three good nights' rest, which he had not had for some time.

The history of the progress of the case during my absence is thus related by Dr. Cantwell: For some ten days or two weeks after my departure, things remained *in statu quo*, but about the 15th, the tumour sud-

denly began enlarging, and attained the most, if not the whole of its great size in three or four days. Evidently the nature of the affection had changed, the true aneurism having burst and become a false one, and there was no more room for delay. Accordingly, on the 28th September, at 2.30 P. M., with the assistance of Drs. Peck, Middleton, and Cantwell, and in the presence of Messrs. Bell and Kemmerle, medical students, and of Mr. Schlegel, one of the Regents of the State University, I proceeded to tie the right subclavian artery.

Operation.—The patient was etherized, and here one of the difficulties of the operation presented itself. As stated, the patient had for years been subject to a violent and harassing cough, of a paroxysmal nature. This was now produced in a high degree by the ether, and once or twice after the incisions were made, the operation had to be suspended, and not only the tumour, but the exposed jugulars seemed to be in imminent danger of bursting.

The usual incisions for ligaturing the subclavian were made. In the lower triangle of the neck the external jugular vein was exposed, which was tied with a double ligature and cut across. A slight opening having been made in the deep fascia with the scalpel, a passage was made to the scalenus anticus muscle by the handle of the knife, and by careful scratching with the fingers. In this proceeding, a vein communicating between the external and internal jugular was cut, and immediately tied. When the cavity thus made was sufficiently cleared out, at the bottom the subclavian artery could both be felt and seen. A common aneurismal needle was then passed under the artery, and upon drawing the knot all pulsation in the tumour and in the arteries of the limb immediately ceased. At the close of the operation the patient was most profoundly narcotized, and was again and for some time in imminent danger of death from suffocation by the great accumulation of mucus in the trachea and bronchial tubes. During the night he was much annoyed by a cough, which gradually grew better, as the expectoration became more free. For some days no untoward symptoms occurred, the pulse being about 90, and a good night's rest being secured by 35 drops of Squibb's compound solution of opium.

Oct. 9 (11th day). Pulse 84 (sitting up), good and full; the faintest possible pulse can be for the first time detected in the right radial artery, which is stopped by a slight change in the position of the arm; the greater portion of the tumour, though greatly reduced in size and tension, is yet soft, and gives a sense of fluctuation to the touch.

17th (19th day). Tumour soft and fluctuating all over, inclined to point in the axilla.

24th (26th day). Abscess has a crepitan feeling just beneath the clavicle, has opened in the axilla, and is discharging a large quantity of highly putrid blood.

Nov. 3 (36th day). 9 A. M. Called suddenly, and found patient sitting up and supported by his wife; face blanched and covered with a cold perspiration; a great hemorrhage had suddenly occurred, a quart, at least, of blood being caught in a basin, beside what was in the bed-clothes, oakum, dressings, etc.

The bleeding had ceased before I reached him (say in 10 minutes). He was laid in bed, the dressing removed, the orifice and lower portion of the cavity stuffed with pledgets of cotton-wool saturated with Monsell's solution, a compress placed in the axilla, another just under the clavicle, and the whole bound up firmly with turns of a figure of 8 bandage.

Brandy was rather freely given, and by 12 o'clock reaction was fully established, with a pretty good pulse at 112.

7th (40th day). Pulse 110. Removed dressing and the hard plug of iron, cotton, and blood. This gave vent to a large quantity of pus and putrid blood, which flows from a cavity, apparently extending from the axilla nearly to the sternum, and from the clavicle somewhat below the nipple.

10th (43d day). Removed main ligature.

15th (48th day). 3 A. M. Called suddenly to patient on account of hemorrhage. Reached him in a few minutes to find him, as before, sitting up, almost in a state of syncope, with blanched face, cold brow, rapid and thready pulse. As the bleeding had already stopped I did not remove the dressings, but placed the patient in bed and gave brandy.

10 P. M. Called to patient on account of bleeding, which proved to be venous, and was found trickling slowly from the lower orifice. Plugged with a pledget of cotton-wool wet with Monsell's solution.

27th. 6 P. M. Called suddenly, and reached the patient in less than five minutes, to find him almost moribund from a hemorrhage, which came from the lower orifice, of a bright red colour, and in distinct jets. Plugged with cotton and Monsell's solution.

28th (61st day) 8.30 A. M. Called suddenly, and found patient in a fainting condition, though there was no bleeding externally.

29th. At 1 P. M. was called and found blood oozing from a number of cracks in the most prominent part of the tumour in the axilla; plugged the largest one; the whole seemed in imminent danger of bursting, which would likely take place from coughing, but at 11.45 P. M. he quietly passed away.

30th. *Sectio cadaveris* 12 hours after death.—The fibres of the pectoralis major were of a dirty-yellow colour, and much weakened, contrasting strongly with the bright red of the other muscles. Upon cutting through the great pectoral an enormous cavity was displayed, reaching from the clavicle to a point below the nipple, and from the origin of the great pectoral to the shoulder-joint; with a branch cavity of large size, extending backwards alongside of the capsule of the shoulder joint, ending in a large pouch between the scapula and the ribs; and yet another branch, a smaller one, extended down the sheath of the brachial vessels, with the brachial vein hard and knotty from phlebitis, but the artery had remained intact and pervious. The whole of this cavity was lined with a dense membrane, which had a smooth, shining surface, stained with blood, except in the vicinity of the orifice, where it presented a rough, ragged, and blackened appearance. In the upper part of the cavity, just below the clavicle, could be seen the remnant of the original sac, which was one and three-quarters of an inch long, and from a half to three-quarters of an inch wide. This strip was quite smooth, was on a level with and firmly imbedded in the dense membrane, ending below in a slight dilatation of the axillary artery, with the open orifices of two arteries; above the remnant of the sac ended in a conical pouch from which protruded a plug of fibrine, having much the appearance of a nerve cut across, it was easily removed, and from its softness was deemed quite recent. It was at first thought that this plug might be traced to an artery opening into the upper part of the sac, or into a pervious part of the artery between the sac and the obliterated artery, but on a more careful examination, after the re-

moval of the parts, no such communication was found; indeed the obliterated vessel extends down to and joins the upper angle of the sac.

The heart was larger than normal, the right side being filled with a dense fibrinous clot. The arch of the aorta with the right subclavian and the axillary to where it disappeared under the above membrane (say one inch below the sac), was removed and carefully examined with the following result:—

There is undoubtedly a considerable enlargement of the aorta, the circumference of the middle part being somewhat over six inches, while the end sections, just beyond the valves, and just beyond the origin of the left subclavian, have diameters respectively of one and a quarter and one inch.

The internal surface of the aorta was thickly studded with atheromatous plates, which had a pink colour when viewed across the outer membranes, but a yellowish or fatty appearance when seen from within. On the arch, and near the origin of the innominate artery, is a pouch or protrusion, evidently a young aneurism; this is marked by a dark spot on the outside, and when the vessel is inverted the little pouch is found to have a diameter of half an inch, and nearly the same depth; the whole is of a dark purple colour, which remains after maceration. Just within the margin there is a groove or furrow which is circular, and marks the extent of the atheromatous plate, which is the foundation of this beginning aneurism.

The cord-like or obliterated artery is three-quarters of an inch long, and extends from the sac, which it joins, to within half an inch of the thyroid axis, which is the first branch above. The exact position of the ligature cannot be well made out in the removed specimen.

The information in regard to the source or sources of the hemorrhages, afforded by this examination, is undoubtedly very imperfect and rather negative in its character.

From the history of the case, of the four hemorrhages, the first was arterial beyond a doubt; the second was of a doubtful nature, but was probably venous; the third was venous, as proved by inspection; the last was truly arterial, and spouted from the orifice in distinct jets.

The whole history of this case seems to show, that in axillary aneurism, after the bursting of the sac, the Hunterian operation of tying the subclavian is not to be depended on; but that we must resort rather to Syme's plan, or, what I should deem preferable, the plan suggested by Dr. T. G. Morton, of Philadelphia, in the account of his celebrated case (*Am. Journal of Med. Sciences*, July, 1867), which consists in first tying the subclavian as usual, then laying open the cavity, and tying the axillary, both above and below the ruptured sac.

Had this plan been pursued in the present case, the result might have been otherwise.

But it will be seen, that at the termination of the ligation, the patient was in imminent danger of asphyxia, from the combined effect of the ether and the accumulation of mucus in the bronchial tubes; thus our whole attention had to be devoted to saving the patient's life, which was only achieved after many hours' labour.

The cavity was not laid open at the time of either of the arterial

hemorrhages, from the fact that both times the sudden loss of blood was so great as to bring the patient to death's door in a few moments, and nothing seemed possible but to stop the bleeding by plugging up the sac.

The disproportion between the apparent loss of blood externally, and its tremendous effect, is now explained by the great size of the cavity, into which the blood was poured, and into which it continued to flow for some time after the plugging, leading at the time to the suspicion of an internal hemorrhage.

ART. VII.—*Case of Amputation at the Hip-Joint. Successful Result.*
By GEO. D. TOWNSHEND, M.D., of Boston (Highlands), Mass.

In April, 1871, while I was practising in Norfolk, Va., I was requested to visit a well-developed negro lad, nineteen years old, named Alex. Prior, who, about ten days before the date I was called to see him, received a punctured wound of the right leg; the inflicting instrument being a medium sized penknife blade in the hand of a comrade with whom Prior was quarrelling. The wound was not over half an inch in length, and was situated at the antero-external aspect of the external condyle of the femur, on a line one inch above the upper edge of the patella, and about half an inch to the outside of a line perpendicular to the external edge of the patella. Prior stated there was considerable resistance experienced when the knife blade was withdrawn, and followed by quite free hemorrhage and a dull, deep-seated pain. The bleeding ceased spontaneously, and the pain subsided in a few hours. Meantime, the boy had walked to his home, not far distant.

In a few days after reception of the wound, active symptoms of inflammation supervened, accompanied by sharp, lancinating pains about the knee-joint, and dull, deep-seated pain; "pain in the bone," as Prior expressed it, extending up the thigh. Inflammatory features, with consequent suffering, increased to such an extent that, at the time above referred to, about ten days after the primary injury, Prior concluded professional service was necessary. I found the lad lying on a bed, inclined to his right side, with knee and thigh flexed and everted. Any effort to move the greatly swelled limb occasioned excruciating pain about the knee and above it. Relatively, the swelling was less below the knee. He had high fever, quick, rapid pulse, no appetite, and, except in very short naps, had been sleepless for forty-eight hours previous to my seeing him. After careful examination I could not detect any fluctuation, but very aggravated symptoms were apparent. As Prior would not eat, I enjoined a good supply of milk and whiskey, and free use of morphia to relieve pain, with anodyne and cooling applications to the knee and thigh. Next day the patient was more comfortable under the influence of the anodyne; no other change. This condition remained about the same for several days, when I was summoned to Philadelphia very suddenly, and was detained there about two weeks. Before I started I told Prior to continue the treatment I had previously directed, and in case of my