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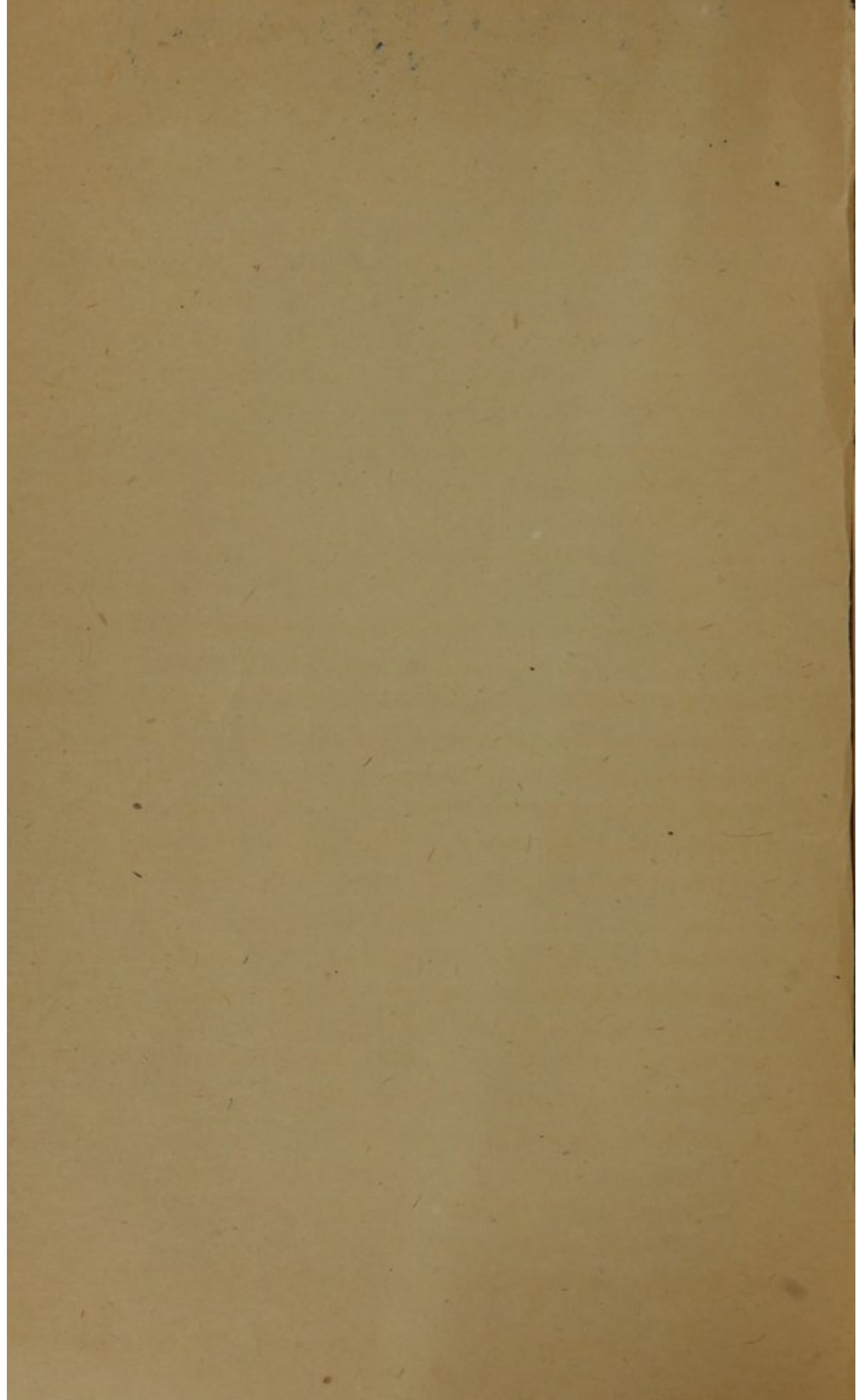
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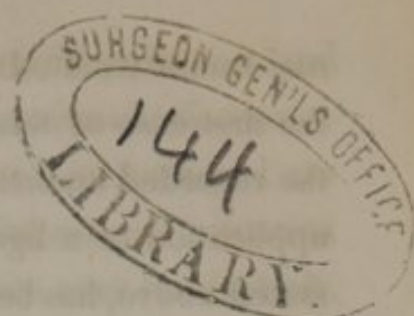
Warren (J. Mason)

Ligature of the left
subclavian artery xxx





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LIGATURE
OF THE
LEFT SUBCLAVIAN ARTERY
FOR SUBCLAVIAN ANEURISM;

WITH A REMARKABLE DEVIATION OF THE VESSEL AND CONSEQUENT CHANGE
OF ITS RELATIONS.

BY J. MASON WARREN, M.D.

THE great mortality attending the ligature of the larger arterial trunks, and of the subclavian in particular, gives interest and importance to any case of operation on those vessels. In the latter this interest is increased by its deep situation, causing in many cases a great difficulty of reaching it, and by the importance of the organs in its immediate neighborhood. According to the valuable tables furnished by Dr. Norris, in some former numbers of this Journal, out of 69 cases of ligature of the subclavian artery, 36 recovered, and 33 died, or nearly one-half. In operations on the iliac arteries, out of 118 cases, 85 recovered, and 33 died. From 38 cases of operation on the carotid artery for aneurism, 22 recovered, and 16 died. In every instance where it has been necessary to place a ligature on the subclavian artery on the tracheal side of the scaleni muscles, the result has been fatal.

The case which I propose at present to relate, offers some peculiar points of interest, apart from the general one of the ligature of the vessel. Among the principal of these may be mentioned the fact of a ligature having been applied to the artery for an aneuris-

mal tumor situated above the clavicle, being, so far as I am aware, the first case of this kind that has had a successful result, because the recorded aneurismal tumors in that situation have required the application of a ligature within the scaleni, and the termination, as stated above, has been unfavorable. *Secondly*, the anatomical peculiarities in the relations of the vessel, to which may be attributed the possibility of the ligature on the outside of the scaleni. *Thirdly*, the rapidity with which the collateral circulation was restored, the pulse having been felt at the wrist twenty-four hours after the operation. *Finally*, the length of time the ligature remained attached, *ninety-six days*, notwithstanding all safe means were made use of to detach it.

Without further prelude I shall proceed to the description of the case.

Miss A., thirty years of age, of delicate constitution, had a congenital club-foot of the worst kind, and, in consequence, a double curvature of the spine. For the former of these she was treated eight or ten years since by Dr. Brown at his infirmary, and the foot, after the section of the tendons, followed by the appropriate treatment, was completely brought into its natural position, so that she was enabled to walk with ease, without the aid of any mechanical support. The curvature of the spine was submitted to a similar treatment with the same successful result.

At the request of Dr. Brown, she consulted me in the early part of December, 1847, for an aneurismal tumor situated just above the scapular end of the clavicle, about the size of a pigeon's egg, of which she gave the following history :

Four months previous, while in attendance on a sick brother, she had occasion to draw the cork from a bottle, and felt at the moment a sudden crack at the point where the present tumor is situated. Her attention was not attracted to it at the moment, but a short time afterwards a small swelling, having a decided pulsation, was distinguished at that spot, which has gone on increasing until

it has attained its present size. It had a powerful pulsation, and possessed the usual thrill characteristic of an aneurismal affection.

After having examined the tumor and learned its history, I endeavored to discover the subclavian artery in its normal situation beneath the clavicle, at the point where it passes over the first rib. To my surprise, no large vessel or any osseous protuberance answering to the tubercle of the first rib, usually taken as the guide to the artery in this position, could be found. Different parts of the neck were then explored, which finally led to the discovery of a large artery passing obliquely upwards, parallel to, and about an inch removed from, the external border of the trapezius muscle. Compression being made at this point, the pulsations of the tumor ceased, as well as the pulse at the wrist. There was no question, therefore, in my mind, that this was the subclavian artery, but it was more difficult to determine the cause of this remarkable anomaly.

I now sought for the first rib, and to my surprise discovered both the first and a part of the second rib passing obliquely across the neck above the clavicle. The insertion of the scalenus anticus muscle into the first rib, was at length distinguished; the tubercle, however, was not sufficiently developed to be manifest to the touch. The whole osseous system of the chest in this case seemed to have undergone a partial displacement. The spine and ribs attached had been, as it were, moved upwards; while the sternum was carried in an opposite direction.

Making a strong compression on the vessel above the tumor, the arm became extremely painful with a sensation of numbness, and on a subsequent and more careful examination the whole brachial plexus of nerves could be discriminated, in immediate contact with the artery.

As the tumor was rapidly increasing, it was evident, that, considering its situation and the great danger of delay, no time was to be lost, if any surgical operation was to be resorted to for its relief.

The patient, a person of much fortitude and force of character, agreed at once to the course advised. The operation was performed, on December 24th, in the presence of Dr. J. C. Warren, Dr. Brown, Dr. Buckminster Brown, Dr. Bartlett, of Roxbury, Dr. Morland and Dr. Slade.

An incision, about two inches long, was made, extending from near the outer and upper edge of the sterno-mastoid muscle downwards, in the direction of the scapulo-clavicular articulation, and an inch from the edge of the trapezius muscle, the pulsations of the vessel being the principal guide, as the other anatomical marks were wanting. This incision divided the skin and superficial fascia; a second cut opened one of the branches of an artery given off from the thyroid axis, which was tied. A nervous band of some size was now encountered, and at its side and directly over the artery a large vein, apparently the external jugular. The vein was carried to the upper part of the wound with a silver hook, and the nerve to the lower; the dragging upon the latter caused a disagreeable and somewhat painful sensation in the arm.

The sheath of the vessel was next opened, the cellular membrane around it cleared away, and the aneurism needle, unarmed, passed from below upwards, on account of the difficulty of introducing it in the contrary direction from the interference of the scalenus anticus, which had its insertion just below. The needle at once encountered and raised the lower nerve of the brachial plexus, which was in the most intimate contact with the artery. By depressing the handle and urging the point forwards, with careful manipulation the eye of the needle was without difficulty brought out between these two organs. The instrument was now threaded with the ligature and withdrawn. Careful exploration was made to ascertain if any nerve was included in the ligature, the painful sensations in the arm caused by drawing the ligature downwards at first leading to the supposition that this might be the case. But when the same traction was made directly upwards, no pain was felt; the former

sensations being produced by the dragging on the cervical portion of the brachial plexus, owing to their connection with the vessel.

The ligature was now tied, and the wound dressed. The pulsations in the aneurismal sac, as well as those of the radial artery at the wrist, at once ceased, and all appearance of tumor vanished. The patient's arm and hand were a little cold directly after the operation, but being rolled in flannel they soon regained their natural temperature.

25th.—Found her quite comfortable. She had passed a quiet night.

26th.—Patient states that the pulse at the left wrist returned for a time last evening, it then disappeared, but returned again, though faintly, this morning. I could not discover it at the time of my visit.

27th.—She has been somewhat troubled by occasional pains in the arm. The pulse was felt yesterday once or twice by Dr. Buckminster Brown, being intermittent. The wound has healed by the first intention. She has suffered occasionally from palpitation of the heart.

29th.—The pulse was perceived, though feebly, at the wrist, but could not be detected in the axilla. The spot formerly occupied by the aneurismal tumor, now presents an obvious depression.

Jan. 2d, 1848.—The pulse is constant at the wrist.

14th.—The ligature still remains on the artery, notwithstanding the traction daily made by the patient in accordance with my directions. A number of large vessels, taking their origin from the subclavian, exist in different parts of the neck. One of these, apparently the supra-scapular, passes directly over the sac, and pulsates so strongly as at first to convey the impression of a return of pulsation in the aneurismal tumor.

March 30th.—Once or twice in the course of the last two or three weeks, finding that the ligature on the vessel was not disposed to become detached, I have seized it with the forceps, and, holding

the artery forcibly down on the rib, have twisted the thread with considerable force. This was done for the third time yesterday, and immediately afterwards the ligature separated, *ninety-six* days after the operation.

The wound almost at once closed.

I saw this patient on September 14th for the last time. At that period she was quite well, had recovered the use of her arm, and was in no way incommoded by the operation to which she had submitted. The aneurismal tumor had in a great measure disappeared; but it still conveys the impression of containing a fluid. Directly on its surface, and incorporated with it, is a very large arterial trunk, supposed, as above stated, to be the supra-scapular. This vessel pulsates powerfully, and at first gives an appearance of pulsation to the tumor; but by careful manipulation can be separated from it. The pulse at the wrist still remained a little less strong than in the corresponding artery of the other side.

Boston, *Nov.* 1848.

To those persons who may have noticed a case of ligature of both carotids, in the April number of this Journal for 1846, an account of the state of this patient, after the lapse of three years, may not be without interest.

The object of this operation, it may be remembered, was to allow of the excision of a fungous tumor occupying nearly the whole of the lower lip, and based on an erectile tissue pervading the tongue, face, neck and chest. This tissue was rapidly increasing, and it was hoped that its growth might be arrested by thus cutting off the direct supply of blood to it.

The arteries were tied in the latter part of the year 1845, and the tumor of the lip was then excised without the occurrence of any alarming hemorrhage.

This patient I have had an opportunity of seeing within a few months, and of making some observations on the state of the circulation in those parts about the face and neck supplied by the carotids.

The situation of the temporal arteries being explored, no appearance of pulsation could be discovered in those vessels. The same was found to be the case in regard to the labial arteries. The angular arteries, where they inosculate with the nasal branch of the ophthalmic, gave the faintest pulsatory motion.

In the region of the neck were a number of large vessels having their origin from the subclavian, among which the supra-scapular was chiefly to be distinguished.

The lip was rather more full in appearance than when the report of the case was made, but free from ulceration.

The functions of the brain had not in any way been disturbed.

