

The Results of Operative Treatment.

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As I have dealt elsewhere¹ with the symptomatology of this condition, I propose to give you briefly to-night the results of operative treatment which I have been able to follow up in twenty-five cases, in which thirty operations were performed. I have personally seen or written to all these patients for the purposes of this inquiry. I wish, at the outset, to express my thanks to my colleagues at the National Hospital, who have very kindly allowed me to trace the after-history of their cases, and also to Mr. Waring and Mr. Rawling, who have given me similar permission with regard to cases operated on by them in St. Bartholomew's Hospital. Five cases of the series have been under my own observation. Operations were performed by Mr. Sargent (twenty), Mr. Armour (three), Mr. Rawling (four), Mr. Waring (one), Mr. Mower White (one), and Dr. Hutchinson (one).

I propose first to consider briefly the immediate effect of the operation itself, for it will be seen that it is often followed by symptoms of more or less severe, though usually transient, character. Thirty operations were performed, as in five cases bilateral ribs were removed. Of the twenty-five patients operated on, of whom two only were males, there were symptoms due to operation in eighteen instances. Such symptoms were pain, more or less severe, in neck, shoulder, or arm, and muscular weakness, which varied considerably both in extent and duration in different individuals. *In eighteen cases pain was complained of*, in some instances being very severe. The duration of this symptom was, as a rule, from one to three months, but there are four cases showing an exceptionally long period of pain, as the direct result of the operation. The periods in these cases are as follows: (a) Two in which pain lasted one year; (b) one case of pain in the scar and shoulder lasting three years, to the present time, and still present to some extent; (c) one case, in which pain is still complained of seven years after the operation; in this case there is, however, a decidedly neurotic element. The pain is peculiarly liable to affect the skin area over the shoulder, and a dragging sensation was complained of in that region in all the

¹ *Lancet*, 1907, i, pp. 1702-7.

cases that persisted over a year. It is probably to be explained by the implication of the superficial cervical nerves in the scar tissue.

Fifteen patients showed motor symptoms.

The usual complaint is of weakness of the whole arm, lasting from two weeks to three months, but in the following cases the symptoms were more pronounced: (a) Two patients had a flaccid paralysis of the whole arm for three and four months respectively; this paralysis was accompanied by changes in the electrical reaction, and ultimately there was partial recovery, but only partial in both cases; (b) one patient had paralysis of the serratus magnus with considerable, but incomplete, recovery after a year; (c) one patient had paralysis of the deltoid and paralysis in the muscles of the hand supplied by the median nerve; the deltoid recovered, but the hand muscles have remained atrophic. In this case there was no muscular weakness before operation, which was undertaken for relief of sensory symptoms. In only *twelve instances* was there absolutely no motor or sensory disturbance following operation.

With regard to the ultimate effects of operation, I propose to divide the cases into four classes, according to the symptoms they exhibited:—

Class I: Vasomotor symptoms only, two cases.

Class II: Subjective sensory symptoms only, five cases.

Class III: Motor symptoms and subjective, but no objective, sensory symptoms, eleven cases.

Class IV: Complete cases which include all the above symptoms, and exhibit in addition objective sensory disturbances.

Class I.—One case, shown by Mr. Waring to-night, in which gangrene was present in the fingers, and which, I think, may be regarded as cured. The second case was one which Dr. Hutchinson, of Lowestoft, sent me, in which symptoms of Raynaud's disease had been present in very marked form for more than two years. There were bilateral cervical ribs, and Dr. Hutchinson subsequently removed the left one, as the symptoms were more pronounced on that side. The result has been very considerable improvement, but not cure. The left hand is now, however, much the better of the two.

Class II: Symptoms purely Subjective—i.e., Pain in the Upper Limb.—Difficulties arise as to the exact diagnosis in such cases as these, brachial neuritis from other causes being common in middle-aged women. As a result, statistics as to the effect of the operation are likely to be misleading. *Five cases of the series are in this class*; seven operations were performed on these. In five instances, pain, which had

existed for periods of from eight months to fourteen years, was much relieved in two, and cured in three cases. In two instances, both of

TABLE I.—IMMEDIATE EFFECTS OF OPERATION IN EIGHTEEN CASES OF THE SERIES.
THE REMAINDER HAD NO POST-OPERATIVE SYMPTOMS.

No.	Name	Sex	Pain	Pain persisting	Motor disturbance
1	A. C.	F.	No pain	—	Arm useless for 2 weeks
2	G. T.	M.	No pain	—	Paralysis of serratus magnus
3	A. W.	F.	Arm and shoulder	1 month	Arm weak 2 weeks
4	A. H.	F.	Pain in scar	Several months	Nil
5	M. C.	F.	Shoulder	2 months	Nil
6	M. M.	F.	Shoulder	2 months	Arm weak for 2 months
7	D. J.	M.	Arm and shoulder	2 months	Whole arm weak for 3 months
8	F. M.	F.	Slight in arm	1 month	Weakness of arm for 3 months
9	M. B.	F.	Severe pain	Some months	Weakness of arm for some months
10	E. C.	F.	Shoulder and arm	3 months	Arm weaker; wasting of deltoid and median muscles, the latter permanent
11	F. S.	F.	Shoulder	2 months	Whole arm weak for 6 months
12	N. W.	F.	Arm and shoulder	6 months	Paralysis of arm for 6 months, with alteration in the electrical reactions; still weaker than before operation 14 months ago
13	A. T.	F.	Elbow to fingers	12 months	Very weak for 12 months
14	R. H.	F.	Arm and shoulder; much pain	14 months	Arm weak for 2 months
15	M. D.	F.	Arm and shoulder	7 years	Flaccid palsy, complete for 3 months; little or no strength for 12 months; hysterical element in this case
16	E. W.	F.	Severe, neck and shoulder; persists, but improving	3 years	Marked weakness; arm almost paralysed after operation for 2 months
17	E. D.	F.	Right arm operation: very severe pain Left arm operation: very painful	6 months 10 months since operation; still persists	Nil Nil
18	E. T.	F.	In shoulder	8 months; still persists	Arm weaker since operation

these being cases in which two operations were performed at intervals for bilateral ribs, the second operations have been, so far, unsuccessful. In one instance, pain of one year's duration in the right arm has only

been partially relieved, eighteen months after the operation. In the second case, pain of four years' duration in the left arm, with operation in April, 1912, is still unrelieved.

Class III.—Eleven cases. Of these, four are greatly improved. In all these the pains have ceased, the hand muscles have increased in size, and strength has returned. The circulation has also greatly improved. I do not think that any of these cases with muscular wasting and vasomotor disturbance, due to cervical rib, are ever *completely* cured as a result of operation. In my experience, neither the muscles nor the circulation ever *quite* regain the *status quo ante*, though for all practical purposes the patients may be regarded as cured. *Four cases have improved.* In one of these the muscles of the hand

TABLE II.—CASES WITH SUBJECTIVE SENSORY SYMPTOMS AND NO MUSCULAR WASTING.

No.	Name	Sex	Age	Duration of symptoms	Date of operation	Result as regards symptoms complained of
1	E. C.	F.	38	3 years	1908	Cured
2	M. C.	F.	52	3 years	November 29, 1911	Pain relieved
3	A. W.	F.	53	8 months	August 20, 1912	Pain relieved
4	E. S.	F.	55	1 year, right and left arms	(a) April, 1911, left (b) June, 1911, right	Cured Unrelieved
5	E. D.	F.	39	Pain, 14 years right Pain, 4 years left	(a) July, 1911, right (b) April, 1912, left	Cured Unrelieved

are again almost normal, but pain persists from the scar. Still, so far as the symptoms referable to the rib go, the patient is practically cured. Another patient, a year after operation, finds the muscle still wasted, but the power of the hand "a lot stronger," and in the third case "there is considerable improvement" in the muscles, and the hand can now be used, whereas before the operation it was useless. There is, however, still pain in this case. The fourth case shows improvement in the wasted muscles, and as only six months have elapsed since the operation, it is probable that the case will make still further improvement. *One case shows no change.* In this case, a band running from the tip of the cervical rib to the first dorsal rib was removed, the cervical rib being left in position. The operation was bilateral, and a similar condition was found on either side. *Two cases are worse than before operation.* In one, eight months after the operation, the arm is

still weaker than it was before, and there is no improvement in the muscles. In the other, two years after the operation, the arm has only partially recovered from the flaccid palsy which followed operation.

TABLE III.—MOTOR SYMPTOMS AND SUBJECTIVE SENSORY DISTURBANCE, BUT NO OBJECTIVE SENSORY LOSS.

11 Cases.

No.	Name	Sex	Age	Duration of symptoms	Symptoms	Time since operation	Result
1	R. H.	F.	31	18 months	Severe pain, left; slight wasting of thenar muscles and interossei, left	14 months	Muscles increasing; hand stronger; no pain
2	F. M.	F.	53	4½ years	Severe pain, right; wasting of thenar muscles and first and second interossei	2 years	Muscles increasing; hands decidedly stronger; no pain
3	D. J.	M.	31	2 years	Slight pains for 1 year; wasting of hand and forearm, right	1 year	Hand much stronger; muscles still wasted; no pain
4	A. C.	F.	26	18 months	Paræsthesia of thumb and first and second fingers; wasting in thenar muscles	18 months	Hand stronger; muscles increasing; no paræsthesia
5	N. W.	F.	40	2 years	Pain, right; wasting of interossei and thenar muscles, left	2 years	Worse; flaccid palsy of arm, from which only partial recovery
				9 to 10 years	Ditto, left	2 years	Improvement
6	F. S.	F.	41	18 months	Wasting in left hand and forearm	3 years	"Arm and forearm splendid"
7	N. W.	F.	45	2 years	Pain in arm and shoulder, left; wasting of thenar muscles, left	3 years	Muscles almost natural again; pain severe, still in neck and shoulder
8	E. T.	F.	28	12 months	Paræsthesia; wasting of intrinsic hand muscles	8 months	Arm weaker than before; no improvement in muscles; pain in shoulder
9	A. T.	F.	43	18 months	Pain in shoulder and arm, right; wasting of intrinsic hand muscles, right	2½ years	Considerable improvement in muscles; can now use hand; still some pain
10	E. I.	F.	43	12 months	Wasting of thenar muscles, right and left; pain right and left for many years	6 months, right and left	No improvement; hand only divided and rib left behind
11	M. M.	F.	50	Years	Pain in right and left arms; wasting of intrinsic muscles, right and left	6 months	Some improvement in muscles; less pain

Class IV: Complete Cases.—There are seven patients in this group. Two of them may be regarded as greatly improved, four others are certainly benefited, and one is certainly worse as the result of the

operation. In the case of the two patients who are greatly improved, symptoms had only existed for eighteen months and seven months respectively. This is what one would naturally anticipate, for it would be unreasonable to expect to cure the muscular atrophy in such a patient as Mr. Rawlings's second case shown to-night, where the wasting is of many years' duration. Yet in this case the pains, which were very severe before operation, have been cured, and the patient has returned for a second operation on the opposite rib, which has now begun to give rise to symptoms.

I think it would be fair to summarize the results of operative treatment of these cases as follows: In a large proportion of cases some symptoms, such as pain and weakness in the arm, may be expected to follow the operation, but not to last more than three months or so. The vasomotor symptoms, which are present in almost all the cases, will be certainly improved, and in the majority of cases pain will be relieved or cured. With regard to muscular weakness and atrophy, the expectation is that the operation, if it is not too long delayed, will greatly improve this condition. There is not, as a rule, complete restoration of the wasted muscles, nor complete recovery from the vasomotor disturbance.

TABLE IV.—COMPLETE CASES.

No.	Name	Age	Duration of symptoms	Time since operation	Result
1	A. H.	22	2 years	22 months	Improvement in muscles, in circulation and in sensation; absence of pain
2	M. B.	36	15 years	7 years	No improvement of muscles, but improvement of pain
3	F. T.	44	18 months	3 years	Great improvement in every respect
4	G. T.	37	5 years	1 year	Very slight muscular improvement; circulation and sensation much improved
5	F. V.	27	8 years	1 year	Some improvement of muscles; circulation better; sensation as before
6	M. D.	49	10 years, pain; 1 year, wasting	7 years	Worse; still pain; flaccid palsy of arm followed operation, from which patient has not yet recovered completely; large neurotic element in this case
7	K. R.	41	7 months	1 year	Improvement marked in muscles, sensation and circulation