PERIARTHRITIS OF THE SHOULDER

A STUDY OF THE DISEASE AND ITS TREATMENT

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Periarthritis, or capsulitis, of the shoulder is characterized by severe pain and progressive limitation of movement of unknown cause. In most cases the symptoms increasingly dominate the patient's activities and interfere with his sleep for many months. The pain and spasm gradually abate and the shoulder becomes stiff (frozen shoulder). Movement usually recovers slowly until full function is regained with either a normal range of movement or limitation so trivial as to cause no functional disability.

This paper presents the results obtained by injecting hydrocortisone into the shoulder-joint while manipulation was being carried out under anaesthesia during the irritable and painful stage. These results are compared with those obtained by oral cortisone in one group, and in some respects with those following palliative physiotherapy, rest, and occasional late manipulation in another group.

Consideration of the results of any form of treatment in periarthritis demands accurate diagnosis and a knowledge of the natural history of the disease. Precise diagnosis is necessary because shoulder pain may be due to a number of causes within and without the joint of varying severity and prognosis. A knowledge of the average time between onset and recovery is of outstanding importance if the effects of treatment are to be assessed in a disease which usually resolves spontaneously.

Diagnosis

In this review periarthritis was diagnosed on the following criteria: (1) pain in the shoulder present for at least three months; (2) inability to lie on the affected shoulder; and (3) loss of at least half the normal range of external rotation movement as measured with the arm at the side, the forearm in supination, and the elbow flexed to 90 degrees.

No case was admitted for treatment unless all three criteria were met. In this way we hoped to exclude pain in the shoulder due to other causes, both organic and psychogenic, and particularly acute supraspinatus tendinitis, which, although often responsible for severe symptoms, has usually a short course and a good prognosis. We have also tried to exclude patients whose periarthritis is well on the way to spontaneous recovery.

Natural History of Periarthritis

This is the factor against which the results of treatment must be measured. Information is unfortunately scanty. Simmonds (1949) followed up 21 such patients for over three years and found that nine continued to have pain and stiffness for this length of time. Meulengracht and Schwartz (1952) followed up 65 cases of painful shoulder for over three years. In spite of the probable inclusion of some cases of short duration (13 were relieved in under six months) no fewer than 27 lasted for six months to one year, 18 for one to two years, and 7 for more than two years.

We have investigated the outcome in 27 patients in terms of duration of pain and stiffness. These patients were treated by palliative physiotherapy or rest in a sling during the acute phase of the disease, supplemented by manipulation under anaesthesia in 13 when the condition became quiescent. Most of them were patients of the late Mr. V. H. Ellis at the Royal National Orthopaedic Hospital.

Disability, expressed as the number of patients recovering at increasing time intervals from the onset of symptoms, was proportionally smaller than the findings of Meulengracht and Schwartz in their larger series. Of our 27 patients, 2 recovered in under six months, 10 in 6 to 12 months, and 6 in 12 to 18 months; 9 had not recovered after 18 months.

Under the above regime rather less than half (44%) may recover within one year. These results are compared with those in patients treated with hydrocortisone and cortisone in our final analysis (see Tables III, IV, and V).

Theoretical Considerations Underlying the Trial

Our knowledge of the aetiology of periarthritis is somewhat vague except in those cases that follow a severe injury. The morbid anatomy of the condition has been clearly described by Neviaser (1945) and others, and we have found similar appearances in a few cases. Neviaser, operating on 10 patients, found thickening and contraction of the capsule, which becomes adherent to the head of the humerus, and adhesions between opposed synovial surfaces, particularly in the inferior part of the joint. Similar changes were sometimes found in the bursa. Microscopically, reparative inflammatory changes were found in the capsule. During manipulation of the shoulder after an incision through the anterior capsule, the capsule separated from the head of the humerus rather like peeling adhesive strapping from skin. After separation of the capsule from the humeral head movement of the shoulder-joint was found to be fairly free. Neviaser therefore suggested the title of "adhesive capsulitis."

These findings give some guide to the correlation between the morbid anatomy and the clinical features. The early pain may be due to synovitis, with loss of movement caused by reflex muscle spasm. Later the stiffness is due to synovial adhesions and capsular thickening. As the acute inflammatory stage passes off, the joint becomes less irritable, but the adhesions are by this time firm bands of mature fibrous tissue, and the shoulder, although less painful, remains stiff.

This concept of the disease receives some support from clinical experience. It has long been known that manipulation under anaesthesia in the acute and irritable phase, far from restoring movement, causes an exacerbation of symptoms and a further loss of movement, whereas manipulation for a stiff but quiescent shoulder frees movement without the risk of recrudescence.

We undertook this investigation to test the proposition that an intra-articular injection of

hydrocortisone by its non-specific anti-inflammatory effect might allow us to manipulate the shoulder in the acute phase and thus cut short the natural history of the disease.

Clinical Trial

Thirty-three patients fulfilling the criteria described above have been treated. Of these, 20 received an intra-articular injection of hydrocortisone, 25 mg., at the time of forcible manipulation under anaesthesia. The manipulation was pressed to the limits of safety as judged by the surgeon, who concentrated first on the restoration of external rotation with traction and followed this by abducting the arm whilst an assistant held the scapula in a neutral position. The manipulation was followed by active movement supervised in the physiotherapy department. The remainder (13 patients) received 2.5 g. of cortisone by mouth over a period of one month in the doses used by Blockley, Wright, and Kellgren (1954), together with supervised active movements. Patients in both series (hereafter referred to as hydrocortisone or cortisone series) were examined monthly for at least nine months or to recovery if this occurred sooner.

One patient in the hydrocortisone series failed to attend regularly for examination and has been excluded, thus reducing the group to 19. Follow-up in the cortisone series was complete.

The response to treatment is assessed and the results are compared in two groups: (1) one month after the beginning of treatment (early assessment), and (2) in terms of the duration of total disability (late assessment).

Both series were compared at the beginning of treatment as regards age, sex, duration of symptoms, and the extent to which external rotation was limited (Table I).

TABLE I

Treatment Group	No.	Age at Onset			
		45–	50–	55–	60–65
Hydrocortisone ..	19	4	5	5	5
Cortisone	13	2	6	4	1
		Duration of Pain in Months			
		3–6	6–9	9–12	12–15	15–18
Hydrocortisone ..	19	11	4	2	1	1
Cortisone	13	12	1	0	0	0
		Range of External Rotation		
		Nil	Quarter Normal	Half Normal
Hydrocortisone ..	19	7	7	5
Cortisone	13	2	8	3

Of the hydrocortisone series 11 were males and 8 females. The cortisone series comprised 3 males and 10 females.

Analysis of Results of Treatment at One Month (Early Assessment)

The patients' condition one month after manipulation in the hydrocortisone series is compared with the results obtained on completion of the course of oral cortisone (Table II). As before, relief of pain, ability to lie on the shoulder, and restoration of external rotation movement are the factors considered. It will be seen that in the hydrocortisone series eight (43%) were able to lie on the affected side after one month, as compared with three (23%) in the cortisone series; and that six of the former had full external rotation but none of the latter. After one month, therefore, the advantage clearly lies with the hydrocortisone series.

TABLE II

Treatment Group	No.	Effect on Pain		
		Much Improved	Improved	No Change
Hydrocortisone ..	19	9	8	2
Cortisone	13	5	3	4
		Ability to Lie on Affected Side			
		Yes	Sometimes Wakes	No	Uncertain
Hydrocortisone ..	19	8	4	3	4
Cortisone	13	3	0	10	0
		Range of External Rotation				
		Full	Three-quarters Normal	Half Normal	Quarter Normal	Nil
Hydrocortisone ..	19	6	4	9	0	0
Cortisone	13	0	4	4	4	1

Late Assessment (Analysis of Results of Treatment in Terms of Total Disability)

This analysis shows the time taken for full recovery; by this we mean the restoration of normal function without pain, and accept loss of the last few degrees of abduction or external rotation as compatible with this provided that pain is completely relieved. In this comparison of results it is misleading to consider only the time interval between treatment and recovery; this would not take into account the stage of the disease when treatment was begun, and would ignore the fact that the condition normally recovers spontaneously. We have therefore tabulated in both series the number of recovered cases one year from the onset of symptoms and the results three months after treatment began in those patients accepted between three and six months from the onset of symptoms. We have also included the patients already mentioned who received neither cortisone nor manipulation with hydrocortisone. This group is called the "control series."

In Table III the results favour treatment with hydrocortisone, but the difference is less convincing when both groups are compared one year from the onset of symptoms regardless of the time at which treatment began after the initial three-months waiting period (Table IV).

TABLE III.—*Number of Recovered Cases Three and Six Months After Treatment*

Treatment Group	No.	Well at 3 Months	Well at 6 Months
Hydrocortisone	19	11 (58%)	15 (79%)
Cortisone	13	2 (15%)	6 (46%)
Control	27	8 (29%)	14 (52%)

TABLE IV.—*Number of Recovered Cases One Year From Beginning of Symptoms*

Treatment Group	No.	Well One Year from Onset
Hydrocortisone	19	13 (68%)
Cortisone	13	7 (54%)
Control	27	12 (44%)

TABLE V.—*Results of Treatment in Patients Whose Symptoms have Lasted More than Three and Less than Six Months—Reviewed Three Months Later*

Treatment Group	No.	Well in Three Months
Hydrocortisone	11	9 (82%)
Cortisone	12	2 (17%)
Control	16	5 (31%)

However, the results in those patients treated between three and six months from the onset of symptoms swing strongly in favour of the hydrocortisone series (Table V).

Failures

We regard any case in which recovery is not complete within six months of treatment as representing a failure of the method. This is, of course, an arbitrary standard which, however, allows time for the benefits (if any) of treatment to become apparent and yet does not encroach too far upon the time needed for spontaneous recovery. In both series there were failures whose subsequent course is as follows.

Hydrocortisone Series.—Four of the 19 patients failed to respond in six months. Of these, two subsequently recovered, one 11 months and the other 14 months after the injection and manipulation, which in these patients did not seem to influence the outcome. One remains in pain after two and a half years, and although one is working as a hospital porter he still cannot lie on his shoulder 18 months after treatment.

Cortisone Series.—Seven of 13 patients failed to respond in six months. Two recovered later, one nine and the other 12 months after oral cortisone; one was in pain after one year; and one recovered after a manipulation without hydrocortisone for painless stiffness at 14 months. The remaining three deteriorated and were subsequently treated by manipulation with hydrocortisone—two at four months and one at five. Although one failed to attend for adequate follow-up he was improving when last seen. Two had fully recovered in three months. It must be emphasized, however, that these two patients recovered 10 and 11 months from the onset of symptoms, so that we hesitate to credit treatment as the one factor responsible for their ultimate recovery.

Correction for Age and Sex

It is apparent from Table I that there is a wide variation in the sex incidence between the hydrocortisone and the cortisone series, and there are also differences in the age grouping. In the control series, however, the patients are nearly equally divided. The results in 24 patients of the control series who have been followed to recovery are compared with those in the 29 patients in the other two groups who recovered while under observation. It has shown that age is not a significant factor in prognosis, but that women have a somewhat more unfavourable outlook than men. In the control group the average duration for women exceeds that for men by eight months; this represents approximately half the average disability period for all the cases in this group. In the hydrocortisone series 100% of the men treated between three and six months from the onset of symptoms were well in three months, as compared with 66% of the women. In the cortisone series of the same time interval 22% of the women recovered but none of the men, and in the control series 22% of the women again and 43% of the men. Six months from the beginning of treatment it was found that recovery had occurred in 87% of the women and 73% of the men of the hydrocortisone series; in 60% of the women and none of the men in the cortisone series; and 31% of the women and 71% of the men in the control series.

The results of the hydrocortisone series are therefore superior to those obtained by the other methods used in early cases. The apparently small differences in the percentages of men fully recovered six months after treatment between the hydrocortisone series and the controls (73% : 71%) is explained by the fact that the average duration of illness in the male controls was 11 months, which is much shorter than the average duration for the female controls, so that this rate of recovery would be expected regardless of treatment.

Summary and Conclusions

Fifty-nine patients with periarthritis of the shoulder of a standard minimum severity and duration have been studied.

The results of treatment by physical methods sometimes followed by late manipulation under anaesthesia, by physical methods in combination with oral cortisone, and by physical methods with early manipulation under anaesthesia after injection of hydrocortisone into the shoulder have been compounded.

In this analysis of results of treatment the following factors have been taken into account: (*a*) the anticipated duration of the illness obtained when steroids are not used; (*b*) the influence of sex and age upon the natural history of the disease; and (*c*) the duration of the symptoms when treatment began, and its effects in relation to this factor and the natural history of the disease.

The use of hydrocortisone combined with manipulation under anaesthesia together with physical methods was found to relieve symptoms more effectively than oral cortisone combined with physical methods in the early phase of periarthritis of the shoulder.

Hydrocortisone as used in this trial reduced the total disability period in comparison with physical methods with or without oral cortisone.

In this trial oral cortisone did not improve upon the results obtained by physical methods alone in reducing the total disability period.

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"The opportunities for general practitioners to travel abroad and meet their fellows in other lands are lamentably inadequate. It is sad to think that, unlike our hospital colleagues with travel funds to draw upon, the G.P. can only attend an international conference on his own initiative and usually at his own expense. At a time when the general practitioner's contribution to medicine is becoming more and more important, it is inappropriate that his voice should not be heard at important international gatherings."—From the College of General Practitioners' *Northern Home Counties Faculty Journal*, vol. I, 1959.