steroids help to correct the condition through a direct action upon the muscle itself rather than through suppression of the lymphocyte function.

References

- Bontoux, D., Kahan, A., Brouilhet, H., Amor, B., Delbarre, F., Jouanneau, M., and Gniazdowska, E. (1971) *Rev. europ. Et. clin. biol.*, 16, 166 (Effect and mode of action of chlorambucil in rheumatoid arthritis)
- Kahn, M-F., and Sèze, S. de (1971) 'INSERM Colloque', Hôpital Cochin (Paris) 3-5 November (Polyarthrite chronique rhumatoïde et immunodépression)
- Lorber, A., Bovy, R. A., and Chang, C. C. (1972) *Nature (New Biol.)*, 236, 250. (Relationship between serum gold content and distribution to serum immunoglobulins and complement)
- Soothill, J. F., and Steward, M. W. (1971) *Clin. exp. Immunol.*, 9, 193 (Immunopathological significance of the heterogeneity of antibody affinity)

Rosette-forming Cells in the Peripheral Blood of Patients with Rheumatoid Arthritis. By H. KEITH and H. L. F. CURREY (The London Hospital Medical College)

This paper is published in full with the discussion on p. 202 of this issue.

Excision of the lower end of the ulna in rheumatoid arthritis. By N. A. RANA and A. R. TAYLOR (Oxford Regional Rheumatic Diseases Research Centre, Stoke Mandeville Hospital)

Removal of the lower end of the ulna was first carried out in 1880 and later recommended for traumatic disorganization of the inferior radioulnar joint. More recently it has been used in rheumatoid arthritis for the destroyed inferior radioulnar and wrist joints.

This paper presents the result of 86 operations followed up for 1 to 8 years, all for rheumatoid arthritis.

The indication for operation were pain, limited rotation of the forearm, and attrition rupture of the extensor tendons. The following results were observed: 94 per cent obtained relief of pain; 87.5 per cent regained full pronation-supination. The return of supination is particularly important for many daily activities, more especially when the elbows and shoulders have limited function.

There was improved power grip in 91 per cent.

Nine patients had concomitant repair of the extensor tendons.

The outcome of operation was also correlated with the radiographic changes in the wrist before operation and at follow-up. Although 94 per cent showed radiographic deterioration, the clinical result remained good.

It is concluded that simple excision of the lower end of the ulna will relieve pain and increase function of the hand in some 90 per cent of patients. It is suggested that this simple procedure can be carried out with success even in the presence of a destroyed wrist joint, and that the operation of arthrodesis of the wrist is rarely necessary.

Discussion

DR. B. ANSELL (Taplow) Firstly, have you had any ruptured tendons after operation? Secondly, were there any cases in which there has subsequently been complete dissolution of the carpus? We have had two patients who have been left with gross ulnar drift at the wrist.

MR. TAYLOR No; I think we are probably fortunate, but we have not had any occurrence of tendon rupture following repair, nor have we had any ruptures following excision of the lower end of the ulnar for pain. We have

had an increase of carpal shift, but none in which the carpal bones have completely dissolved.

PROF. J. J. R. DUTHIE (Edinburgh) I should like to confirm the excellent results of this operation in Edinburgh. There is one question I want to ask—How often do you notice fusion between the lower end of the radius and the scaphoid?

MR. TAYLOR I think this happens quite often. Part of the operation for fusion of the wrist is to remove the lower end of the ulna, and I think that in the majority it may be this that gives the beneficial results. The wrist is usually pretty stiff when you start.

DR. A. G. S. HILL (Stoke Mandeville) There is another sign which could be called the 'falling change' sign. If you are short of full supination and are given a handful of cash after a purchase, you cannot hold it unless you can supinate fully and this is something that this operation restores. The other point, as was shown by Dr. Hilary Hill to this Society last year, is that the number of these operations rises progressively with a reciprocal fall in the number of wrist fusions. The reason is that pain can be relieved even when there is destruction of the carpus, which in earlier years would have led us to think of fusion.

MR. TAYLOR We often forget completely about this absence of supination. Many patients come back afterwards and say they can now collect their change which is a relatively important thing to us all, even to Professor Duthie!

DR. K. LLOYD-JONES (Mansfield) Do you routinely transpose the extensor retinaculum deep to the extensor tendons?

MR. TAYLOR No.

DR. K. LLOYD-JONES Have you any experience with this operation in patients in whom the head of the radius has previously been removed or vice versa?

MR. TAYLOR Yes; we now have ten patients who have had excision of the lower end of the ulna and the upper end of the radius in the same limb. This has led to no mechanical troubles and we have performed the operations at the same sitting.

Depression of Bone Marrow and Thrombocytopenia associated with Chrysotherapy. By A. KAY (St. Mary Abbots Hospital)

Recent reports of deaths associated with chrysotherapy (*British Medical Journal*, 1971) cause some concern. The records of 55 patients who have shown definite evidence of marrow depression or thrombocytopenia, have been collected; 15 of these patients died. The patients were derived from two sources: 42 from Rheumatology Units in response to personal requests and 13 reported to the Committee on Safety of Medicine. The mean total dose of sodium aurothiomalate (Myocrisin) was 698 mg. (range 40-2,050 mg.). After test-dosing the usual loading dose of sodium aurothiomalate was 50 mg./week continued to a total of at least 500 mg. in 23 patients and to 1 g. or more in five others. There was a small group of ten patients who, without warning, developed blood dyscrasias at a total

dose of sodium aurothiomalate of less than 200 mg. The larger group of patients (39) developed blood abnormalities at a total dose of sodium aurothiomalate in excess of 450 mg. The reactions developed between the tenth and twentieth week of treatment in 23 cases, at total doses ranging from 450–900 mg. sodium aurothiomalate.

There were 15 fatalities associated with marrow aplasia; the immediate cause of death was haemorrhage in 9, infection in 2, and a combination of both in the remaining 4. Blood counts were infrequent during chrysotherapy in several of the fatal cases.

Reviewing the details of all 55 cases *retrospectively*, it was possible to identify features which might have been useful indicators in the 'high-dose' patients. In particular, there was in some patients a progressive fall in total white blood counts, polymorphs, or platelets during treatment. In others, blood abnormalities developed when sodium aurothiomalate was continued without dose reduction after clinical remission of rheumatoid arthritis. It is concluded that marrow depression and thrombocytopenia are rare but serious complications of chrysotherapy. It is suggested that the dangers of blood dyscrasias can be further reduced if full blood counts are undertaken regularly and the dose level of sodium aurothiomalate reduced when clinical remission has been achieved. There remain a few patients, particularly in the 'low-dose' group, in which there appears to be no warning of impending blood disorders.

Discussion

PROF. E. G. L. BYWATERS (*Taplow*) What was the value of eosinophil counts?

DR. KAY It would be very helpful if more people did differential counts earlier in the course of gold treatment. We might then be really in a position to say what the value was. They are infrequently done.

DR. J. T. SCOTT (*London*) The extent of marrow damage bears some relation to the total dose of gold administered. Some years ago Dr. Michael Denman, while at the Hammersmith Hospital, did a literature search and found that the total dose which had been given to patients developing thrombocytopenia was 0.65 g.; in patients with leucopenia 1.32 g.; and in patients with complete marrow aplasia 3.51 g. Of course, ranges and overlap were wide. Mortality in the three groups was 20, 35, and 76 per cent respectively.

DR. KAY I think that the total dose should be seen in relation to the time during which it has been given.

DR. P. J. L. HOLT (*London*) You did not comment on the erythrocyte sedimentation rate and clinical response. One of the biggest causes of toxicity, I think, is overtreatment—that is putting patients on to a course of treatment. There seems to be no rationale for specifying ten or twenty injections of 50 mg. We do not do it for anything else and I think that continued reassessment of the ESR and clinical response are important in regulating treatment.

DR. KAY I completely agree that we should assess the dose response relationship more carefully in these patients.

PROF. E. G. L. BYWATERS Can I ask about re-treatment? Does a second course carry a greater danger of marrow depression?

DR. KAY It was not apparent in the series.

DR. R. GRAHAME (*London*) Do you have any information on the relationship between marrow toxicity with gold and blood levels of gold or evidence of cell-mediated immunity to gold?

DR. KAY I have no information but understand that, regarding serum levels, there is no absolute correlation.

DR. T. C. HIGHTON (*New Zealand*) Dr. Palmer and I are doing some work along these lines but so far have been unable to find any relationship.

PROF. J. J. R. DUTHIE (*Edinburgh*) Have you any idea of the total number of treated patients from whom these figures of toxicity arose?

DR. KAY This is very important, but I cannot think of any way of getting this information.

DR. A. G. S. HILL (*Stoke Mandeville*) Do you think the traditional test dose is anything more than a gesture?

DR. KAY I would not think so. Perhaps we should use lower doses up to a total of 200 mg. Myocrisin.

DR. P. D. FOWLER (*Macclesfield*) I should like to stress what Dr. Kay says about the difficulties of retrospective surveys of this type. In my experience it is often extremely difficult to determine the relationship between drug and reaction. There is a very interesting parallel to blood dyscrasias with phenylbutazone in that leucopenias arise early in treatment and aplasias of the sort described here after long periods of treatment. Did you try to relate the annual frequency rate of dyscrasias with the manufacturers' annual turnover of the drug? This *might* give you some clues as to whether they are related.

DR. KAY It does correlate to a certain degree.

DR. J. GLYN (*London*) Do you consider that it is a malpractice to give phenylbutazone and gold simultaneously?

DR. KAY Many people over the years have used this combination of drugs without ill-effects.

DR. D. N. GOLDING (*Harlow*) May I make a comment on behalf of those working on D-penicillamine in a multicentre trial? It has been our impression that patients are more likely to get thrombocytopenia on penicillamine if they have had gold treatment during previous months.

Reference
British Medical Journal (1971) 1, 471 (Gold for rheumatoid arthritis)

A Study of Renal Disease in Rheumatoid Arthritis. By A. V. CAMP, A. G. MOWAT, W. B. FLETCHER, M. S. DUNNILL, and A. G. McIVER (*Nuffield Orthopaedic Centre and United Oxford Hospitals*)

The only clearly recognized renal abnormalities associated with rheumatoid arthritis are amyloidosis and drug nephropathy (Burry, 1971), but it has been suggested that there may be a specific renal lesion in rheumatoid disease. Accordingly, thirty unselected patients with definite or classical rheumatoid arthritis were studied by a variety of