Heberden Round, 1972

This was conducted by Dr. H. L. F. Currey at the London Hospital. He showed a series of patients illustrating the rheumatological complications of chronic renal disease, haemodialysis, and renal transplantation.

Clinical meeting, March, 1972

At a meeting held at the London Hospital on March 3, 1972, the following papers were given:

Synovial Biopsy in Haemochromatosis Arthropathy; Histological Findings and Iron Deposition in Relation to Total Body Iron Overload. By R. J. WALKER, I. W. DYMCK, I. O. ANSELL, E. B. D. HAMILTON, and R. WILLIAMS (*King's College Hospital, London*).

Published in the *Annals* (1972), **31**, 98.

Discussion

PROF. E. G. L. BYWATERS (*Taplow*) The speaker tantalized us by not saying very much about pyrophosphates and their relation to iron and the arthropathy because the group has mentioned this before. I am sure the Society as a whole would like to know about the particular relationship here. Also, in the two patients untreated who showed no haemosiderin, what about unaggregated ferritin? Did you look for this in electronmicroscopic studies?

DR. WALKER We only looked for haemosiderin deposition so that I cannot add anything with respect to your second point. As for pyrophosphates, I tantalized you because I cannot add anything to what has been said before. As you know, the suggestion has been made that pyrophosphate might be deposited in cartilage and synovium because iron has interfered in some way with the function of pyrophosphatases. As far as I know, this has not been shown in joints, but there is some evidence that iron can interfere with the pyrophosphatases in human erythrocytes (McCarty, Pepe, Solomon, and Cobb, 1970).

DR. HAMILTON Electronmicroscopic studies have been carried out by Schumacher (1972) who has found that in haemochromatosis, the iron is deposited chiefly in the synthetic or Type B lining cell and to a lesser extent in the phagocytic Type A cell. The reverse is true in other conditions, including rheumatoid arthritis.

DR. M. A. CHAMBERLAIN (*Leeds*) May I support that; we have been injecting guinea-pigs with iron intravenously and found that between 10 minutes and 8 days later the iron is seen by electronmicroscopy to be present in A cells, the phagocytic synovial cells, but not in the B cells nor in any intermediate cells.

DR. H. L. F. CURREY (*London*) Did you examine the sections by polarized light microscopy, and did they contain crystalline pyrophosphate?

DR. WALKER Under polarized light, none of the synovial specimens but three of the five cartilage specimens examined at autopsy did contain calcium pyrophosphate.

DR. R. A. STOCKWELL (*Edinburgh*) Did you notice where the iron deposition occurred, and particularly if it was in the deeper aspects of the cartilage rather than near the surface?

DR. WALKER We were unable to find iron in the cartilage from our patients. Some workers, such as Sheldon (1935), have reported chondrosiderosis and perhaps our inability to demonstrate this feature may be related to the small number of patients in whom we examined the cartilage, and to the fact that the majority of them had been depleted of iron by multiple venesection therapy.

DR. B. VERNON-ROBERTS (*London*) In haemochromatosis does iron occur in both the ferric and ferrous forms? Perles's iron stain demonstrates only the ferric form of iron and has to be modified in order to demonstrate the ferrous form.

DR. WALKER We only stained with unmodified Perles's stain, and I cannot therefore comment further.

References

- Chamberlain, M. A., Petts, V., and Gollins, E. (1972) *Ann. rheum. Dis.*, **31**, 493 (Transport of intravenously injected ferritin across the guinea-pig synovium)
- McCarty, D. J., Pepe, P. F., Solomon, S. D., and Cobb, J. (1970) *Arthr. and Rheum.*, **13**, 336 (Inhibition of human erythrocyte pyrophosphatase activity by calcium, cupric and ferrous ions)
- Sheldon, J. H. (1935) 'Haemochromatosis'. Oxford University Press London
- Shumacher, H. R. (1972) *Ann. rheum. Dis.*, **31**, 465 (Ultrastructural characteristics of synovial membrane in idiopathic haemochromatosis)

Hand Measurements in Ankylosing Spondylitis. By J. HARRIS, D. M. CHAPUT DE SAINTONGE, and C. G. BARNES (*The London Hospital*).

Patients with ankylosing spondylitis are often thought of as tall, thin young men. The measurement of height in patients with spinal deformities is difficult, and while thinness can be quantitated, it may be present in any active disease. The aim of this study was to see whether height could be estimated indirectly and whether the bones of these patients were slimmer than normal.

Measurements were made of the bones in the hands of 63 male spondylitics and compared with 136 normal subjects matched for age and sex. Metacarpal and phalangeal dimensions were measured in the way described by Parish (1966). Phalangeal index was expressed as the length divided by the width at the mid-point.

The metacarpal index of the normal patients differed significantly ($P < 0.005$) from existing figures (Parish, 1966). In our series, the metacarpal length correlated strongly with height ($P < 0.001$). However, the metacarpal length of the spondylitics was not significantly different from that of the controls ($P > 0.9$), suggesting that providing the metacarpal length of spondylitics is not altered by their disease they are unlikely to be taller than the control population. The phalangeal index of the spondylitics was significantly greater than that of the controls ($P < 0.005$), but there was no difference in the metacarpal indices.

It was concluded that, while there was no evidence that spondylitics were taller than normal, their proximal phalanges were significantly slimmer. This slimmness did not extend to the metacarpals however. The normal

phalangeal index falls slightly with age ($P > 0.1$); this fall was pronounced in the spondylitics ($P < 0.05$).

A group of 33 acromegalics studied in the same way were found to have phalangeal indices significantly lower than normal ($P < 0.001$).

Factors influencing measures of slimness of the hand bones in a normal population include age, occupation, hand dominance, sex, and radiographic technique. It has become apparent that careful matching for such variables is essential in the study of diseased groups.

Discussion

DR. R. GRAHAME (*London*) I feel that one possible explanation for the disparity between the metacarpal indices found by yourself and by Parish is that he derived his index in a slightly different way. He used the mean of the individual ratios of the four metacarpals and did not take the ratio of the sums of the lengths over the widths.

DR. CHAPUT DE SAINTONGE It comes to the same thing; we calculated the metacarpal index both ways and obtained the same results.

DR. J. G. PARISH (*Clacton*) I believe you have used the same method for calculating the metacarpal index as I used. There was, however, a difference in calculating the proximal phalanx index—I think you have used the mid-point here. The method of measuring bones is becoming very complicated and we have reached the stage now where the whole process will have to be put on computer. The University of Essex is at present devising a machine for scanning hand films electronically and we are hoping to be able to measure not only the length and breadth of the bones and the various indices, but also the shape of the head, the base, and other factors.

DR. M. I. V. JAYSON (*Bath and Bristol*) Do you think that it is fair to use normal subjects as your controls? Do you not think that you should use patients with other chronic inflammatory disorders? Slimness of the bones might simply be a function of chronic disease.

DR. CHAPUT DE SAINTONGE None of these patients had chronic inflammatory disease of their hands. It is a very difficult problem and I am not sure that I can answer it or suggest a suitable control group.

DR. W. W. BUCHANAN (*Glasgow*) You made the point that the metacarpal length correlated strongly with the height, when in fact the correlation coefficient for the third metacarpal was 0.67. The square of r gives us a coefficient of determination of 0.51, which means that you have only accounted for 51 per cent. of the observations; in other words there are 49 per cent. for which you cannot account and this therefore suggests that the correlation with height is rather poor even though it is statistically significant.

DR. CHAPUT DE SAINTONGE Our study shows that hand bone dimensions are determined by many other factors apart from height. This lowish coefficient of variation is therefore exactly what we should expect. The point

is that, of the variables we measured, the third metacarpal length was the best indirect measure of height.

Reference

Parish, J. G. (1966) *Brit. J. Radiol.*, 39, 52 (Radiographic measurements of the skeletal structure of the normal hand)

Phagocytic Activity of Macrophages and Polymorphs in Inflammatory Exudates studied by a 'Skin Window' Technique in Rheumatoid and Control Patients. By J. D. JESSOP, B. VERNON-ROBERTS, and J. HARRIS (*University Hospital of Wales and The London Hospital*)

The macrophages and polymorphs which appear at sites of inflammation, such as joints involved by active rheumatoid disease, are known to be derived from precursors situated in the bone marrow and to migrate *via* the blood stream to inflamed areas. It would seem likely that reliable methods of assessing various parameters of the functional activity of cells migrating to inflammatory sites in rheumatoid patients could provide useful information.

We have studied the phagocytic activity of macrophages and polymorphs migrating to areas of sterile inflammation using a 'skin window' technique in rheumatoid and control subjects. Glass coverslips coated with colloidal carbon were placed on abraded areas of skin on the upper arm and were removed 24 hours later. The percentages ('scores') of macrophages and polymorphs containing visible phagocytosed carbon aggregates was assessed by microscopic examination of the cells adhering to the glass.

- (1) Repeated tests on a healthy non-rheumatoid control subject over short and prolonged intervals up to a year showed that macrophage and polymorph scores varied over a range of 10 per cent.
- (2) The macrophage scores were significantly elevated (Table) in untreated RA patients when compared with non-rheumatoid controls ($P < 0.001$), were markedly decreased in RA patients receiving prednisolone ($P < 0.001$), and were decreased in RA patients receiving gold when compared with untreated RA ($P < 0.001$) or non-rheumatoid controls ($P < 0.05$). Similar changes were observed with the polymorph scores.

Group	No. in group	Percentage cells containing carbon (mean $\pm$ s.e.)	
		Macrophages	Polymorphs
Controls	50	53 $\pm$ 2	24 $\pm$ 1
Untreated RA	61	73 $\pm$ 2	37 $\pm$ 2
RA + Gold	51	45 $\pm$ 2	27 $\pm$ 1
RA + Prednisolone	31	26 $\pm$ 2	11 $\pm$ 1

- (3) Serial studies of patients receiving weekly gold injections showed that macrophage scores fell progressively as treatment continued. There was a significant degree of correlation between macrophage scores and the total dose of gold.
- (4) In a patient receiving monthly gold injections, there was an initial fall in macrophage and polymorph scores in the three days following injection, and a return to pre-injection levels by the end of the month.
- (5) Gold was demonstrable within inflammatory macrophages and polymorphs during gold therapy.