and γ -globulin. Analysis of the urine shows that less than one-half of the total protein content consists of albumin and that one-third is made up of α_2 -globulin. Squire (1953) gives a figure of 300,000 for the molecular weight of α_2 -globulin compared with 69,000, the molecular weight of albumin. The leakage of the large globulin molecule indicates loss of selective permeability and therefore gross damage to the glomerular membrane (Hardwicke and Squire, 1955).

Two months after steroid therapy it is apparent that the serum proteins show a slight rise of the albumin fraction (Fig. 3). The general pattern is, however, unchanged. The urine picture is markedly different (Fig. 4). Only 12.5% of the total protein is globulin; the rest consists of albumin. This could be interpreted as a recovery of the selective permeability of the glomerular membrane.

The third analysis, made seven months after treatment, supports this view. The serum proteins (Fig. 5) are almost within normal limits, apart from a rather high α_2 -globulin. The bulk of the urinary protein again consists of albumin; only 15% is made up of globulin (Fig. 6).

FIG. 5.—Serum protein electrophoresis on August 28, 1958.

FIG. 6.—Urine protein electrophoresis on August 28, 1958.

Too much emphasis cannot be laid on the absolute values of the individual protein fractions estimated by paper electrophoresis (Wolstenholme and Millar, 1956). Furthermore, it is conceivable that some denaturation of the urinary proteins may occur as a result of the extraction methods. Only marked changes in pattern are therefore considered significant.

The fact that both red cells and casts were present in the urine for a period of nine months prior to treatment, but were suddenly reduced, and finally disappeared during and after treatment, suggests that the improvement was directly due to the hormone.

It would be tempting to suppose that prednisolone treatment had prevented the stage of latent nephritis from progressing into the chronic phase, and that the albuminuria was a legacy of permanent renal damage. Such an optimistic view is difficult to entertain on the result of one case, and past experience has shown that steroids rarely succeed in curing pathological processes. If it could be shown, however, that treatment prolonged the transition into the chronic phase then it would be worth while. Latent nephritis may smoulder for many years with little apparent deterioration in the patient's general condition, so the results of any form of treatment would be difficult to assess. Nevertheless, at the present time there is no known treatment which will directly influence the course of the disease, and it does seem that a trial of the newer synthetic steroid preparations would be justified.

Summary

In a patient with latent nephritis blood and casts disappeared from the urine during treatment with

prednisolone. Evidence is given to suggest that the drug had a direct effect on the improvement of glomerular permeability.

It is considered that more extensive trials would be justified.

I thank Dr. D. G. Bennett for permission to publish this account and for his encouragement; Dr. J. Gibson and the staff of the Bath Central Laboratory for the biochemical investigations; and Messrs. Pfizer Ltd., who provided a generous supply of "delta-cortril" (prednisolone).

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SPONTANEOUS HAEMARTHROSIS IN OSTEOARTHRITIS OF KNEE

A REPORT OF FIVE CASES

BY

J. N. WILSON, Ch.M., F.R.C.S.

The Institute of Orthopaedics, London

Haemarthrosis of any joint, if associated with trauma, is usually coupled with a severe intra-articular injury. Spontaneous bleeding occurs in cases of blood dyscrasia, and sometimes will result from tumour invasion. It is known that small intra-articular haemorrhages occur in arthritic knees from time to time, often as the result of minor strain (DePalma, 1954); but it is not widely appreciated that these haemorrhages may be very extensive. Within the past two years I have been able to collect the details of five cases of spontaneous haemarthrosis of the knee. The history has been so characteristic that in two of the cases a firm diagnosis was possible before it was confirmed by aspiration. Although a "doughy" consistency is sometimes thought to be characteristic of a haemarthrosis, difficulty often arises in distinguishing it from an acute effusion. It is felt that the condition may often go undiagnosed and that, if recognized, early aspiration might reduce the period of disability.

Case Reports

Case 1.—A married woman aged 64 was admitted to hospital with a history of sudden swelling of the left knee while she was standing. She stated that three weeks previously there had been a similar incident. The second attack was described "as if the muscles tightened into a knot and the knee swelled." On the first occasion she

noticed that there was some bluish discoloration around the joint. On examination the knee was found to be tensely swollen and warm, the synovia having a "doughy" feeling. The leg was held with the knee slightly flexed, and any attempt to move it was acutely painful. Radiographs showed marked arthritic change around the patella with a vertical fissure through the bone. The knee was aspirated and 53 ml. of unclotted blood was removed. All investigations for blood abnormality or tumour proved negative. The lower limb was immobilized on a Thomas splint for two weeks and then mobilized. After two months the patient had regained a full range of movement.

Case 2.—A married woman aged 65 was seen as an out-patient with a history of sudden severe pain in the right knee when rising from a chair. Within a few moments the joint had become swollen, the swelling starting on the inner side. On examination there was a tense warm effusion, with tenderness all over the knee but maximal over the inner side of the anterior part of the joint line. The range of movement was 175 degrees extension to 110 degrees flexion. Radiographs showed well-marked retropatellar arthritic change. On the history and examination findings a diagnosis of haemarthrosis was made, and this was confirmed by aspiration of 55 ml. of unclotted blood. The right leg was immobilized for a few days in a back splint and then the patient was allowed to carry out active exercises. She regained a full range of movement within five weeks.

Case 3.—This patient, a married woman aged 63, had been under hospital care for arthritis of the knees, hands, and spine since 1947. In February, 1953, she was sent up by her own doctor with a history of having collapsed in the street

Case 4.—Radiograph of the right knee showing minor arthritic lipping behind the lower pole of the patella.

the day before. It was noted that she had a very painful and thickened left knee, and that the joint felt warm. The clinical picture was clouded by a neurotic overlay, so that aspiration was not performed for two weeks. 30 ml. of markedly blood-stained fluid was removed. Two further incidents of bleeding occurred in 1956. Both times aspiration was carried out with rapid improvement in the condition of the knee.

Case 4.—A man aged 50 was seen in June, 1957, with a history of sudden swelling of the right knee occurring when he was standing beside his work bench. There was no causative injury, and the knee seemed to swell in a matter of minutes. An hour before he had been squatting on his heels, but he had felt no pain in the knees. For some years he had experienced "rheumatic pains" in the right knee and hip, and radiographs showed minimal arthritic lipping behind the patella (see Fig.). Aspiration revealed a haemarthrosis. When the case was reviewed some months later the knee was

normal apart from the occasional discomfort which the patient had experienced before.

Case 5.—A married woman aged 83 was seen by her doctor on March 2, 1956, with a history of sudden swelling of the right knee without injury. Examination showed the joint to be tensely swollen and warm. At aspiration 65 ml. of unclotted blood was removed. Within a week the knee had returned to its former state. Another incident two weeks later was successfully treated in the same way. X-ray films taken about this time showed well-established arthritic changes behind the patella and to the outer side of the joint.

Discussion

The diagnosis of this condition has been made largely upon the history. The story of a rapid onset, tense effusion, without any initiating injury, in a case of osteoarthritis, should make the examiner suspect a spontaneous haemarthrosis. In four of the cases described the radiograph showed fairly marked changes; in all the cases there was x-ray evidence of retropatellar arthritis. It has been suggested that the haemarthrosis in arthritis is due to nipping of synovial tags. It is thought that in the present cases the vascular fringe of synovial membrane around the deformed patella may have been involved in this type of injury.

There seems to be little doubt that the best treatment is to aspirate the knee as soon as possible. Smillie (1951) has observed that in massive haemarthrosis the blood in the joint will clot, whereas in the smaller variety the anticoagulant action of the synovial fluid will prevent clotting. Large swellings should therefore be aspirated without delay. It is significant that one patient was thought to be exaggerating her symptoms and valuable time was lost. It is possible that a number of these cases are overlooked and that this condition may be very much more common than was previously thought. Early diagnosis and adequate treatment could reduce its morbidity.

Summary

Five cases of spontaneous haemarthrosis in osteoarthritis have been described.

Points in the diagnosis are discussed.

Early aspiration of the knee is advised.

I am indebted to Dr. A. P. H. Randle, of Garston Manor Rehabilitation Centre, for permission to publish Case 3; to Mr. R. F. O'Driscoll, of Waterford, for Case 4; and to Dr. Peter Guley, of Bushey, for Case 5. I am grateful to Mr. Whitely, of the Photographic Department of the Institute of Orthopaedics, for the reproduction of the x-ray film.

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A Guide to Orthopaedics, by T. T. Stamm, is a short, well-illustrated account of the specialty written for the non-specialist. As the author points out, orthopaedics requires team-work from others besides the specialist — medical practitioners, school and public health doctors, physiotherapists, chiropodists, almoners, health visitors, and many others. To all these, and to nurses and senior students, this book provides a useful introduction to the subject. It is published by Blackwell Scientific Publications, Oxford (Pp. 115; illustrated. 12s. 6d.).