

Discussion

DR. J. B. COOK (*G.B.*) I have been interested that periarticular ossification should vary so much in its frequency between one unit and another and I think we are particularly fortunate in that I have only seen periarticular ossification uncommonly. The first speaker made a point of possible relevance about renal acidosis. And a further point, I think the author said these measurements were taken some 3 or 4 weeks after the injury. Now, it may be that I've seen little of this complication of paraplegia because we have, as you saw from Dr. Settle's paper, a fairly close association with renal physiologists. And, of course, the second and major point is that this once again emphasises that serious complications of paraplegia are determined within a very short time of injury.

CHAIRMAN. Incidentally, Dr. Cook, with reference to the variability of incidence from unit to unit, my experiences over 25 years show that this incidence varies within a unit. There have been times when we've gone for several years—I remember in our unit of 130 beds once beginning to think we'd licked this problem—we didn't know how we'd licked it, but somehow or other what we were doing was right. We went for 4 years without seeing a case, and then within the next 6 months saw half a dozen.

DR. L. S. MICHAELIS (*G.B.*) Forty-five years ago I started my post-graduate life in bone histology and my interest in bone has never lessened and since joining the paraplegic field 22 years ago it has been vastly increased by this mysterious ectopic bone formation. After 6 years of combined effort by Dr. Rossier and his brilliant team he too clearly says he has not solved this problem, and that is greatly to his credit. I had the privilege of being present in Luxembourg at a special meeting of about 40 people who were concerned with ectopic ossification. At this meeting Dr. Rossier's team showed the measurements of the various parameters in much more detail and came to the conclusion that, one cannot say that this bone forms from connective tissue and perhaps, the fact that it forms comparatively rarely is even more astounding than the fact that it forms at all. We must not forget that the number of people with clinically important ankylosing ectopic bone formation is relatively small; it is often one-sided; it happens in spastic and flaccid lesions. Now, to Dr. Nechwatal—I liked her paper very much. There is room for many more people to engage in this field. But, I must say she was drawing a little too many conclusions—too firm conclusions—with regard to clinical treatment from the biological data. I do not think it can be said that you must rest or stop the patient from standing, or stop physiotherapy simply because you know this and that parameter of biochemistry. One last word: Dr. Rossier, his team and I came independently to the same conclusion. If you have, because of ankylosis of the hip joint, to operate—and I tell you from experience it is no pleasure technically, because the femoral artery runs straight through it—but if you have to, do not try to produce a clean X-ray. It is quite enough to exercise the essential part of bone which prevents passive movement of the leg to a right angle, so that the patient can sit again comfortably. Before I knew that I would have to wait until the plasma phosphatase comes down, I got recurrences. After I waited for the drop of plasma phosphatase the results have been much better.

DR. F. W. MEINECKE (*Germany*). The question arises as to why some units have so many and others only a few cases of para-articular ossification. But I must ask how many people have really examined their cases routinely?

Strong distinction must be made between bone reactions due to inflammation, such as produced by pressure sores, and the true ossification. If we do that, I feel the frequency will be much less.

With regard to the suggested influence that physiotherapy has an influence on the bone formation I cannot agree with the speaker. I have seen patients who have never had any physiotherapy but did have marked ossification, and we also had patients who had

physiotherapy but only got the ossification on one side and not on the other. I have just published such a case.

MR. T. MCSWEENEY (*G.B.*) I'd like to congratulate Dr. Rossier on this magnificent paper and to add that as a mere orthopaedic surgeon of the tests which he advocated I find that arteriography preceding surgery is a most valuable tool. In point of fact, I think Dr Michaelis just touched on the problem of the main femoral vessel, which may and often does go right slap centre through the mass of bone. But, recently we've had two cases where, in fact, the main femoral artery was occluded and the function of the vascular supply to the lower limbs was taken over by the profunda. It was a source of satisfaction to me, before using a chisel, to know that the main femoral vessel had in fact been occluded.

DR. J. J. WALSH (*G.B.*) I really want to ask Dr. Rossier two questions. First, he showed a very impressive post-operative X-ray illustrating that the process had obviously settled down and wasn't going to recur. Can I ask whether he or his surgeon took any particular precautions at the time of the operation; by local application, putting in a suction drain or any other extra manoeuvre. And the second question is whether he found any correlation between the activity of the process and the urinary calcium output.

DR. ZRUBETSKY (*Austria*). After all we have heard so far, we can now state that we do not know about the origin of these ossifications. We also do not know what we can do about them and no practical advice has been given. On the other hand, we have these terrible pictures before us with those completely contracted hip joints. Frau Dr. Nechwatal has tried to show practical ways, which seem to be simple, to prevent this condition. If Dr. Meinecke points out that there are no connections between passive movements and ossification I confirm first that it is true that calcifications may develop on the one side and not on the other. Böhler has pointed out that after fractures, calcifications can be avoided if no passive movements are carried out. I believe, and we have seen, that there is some relationship between passive movements and myositis ossificans.

Finally, when should we operate? I do not think that the technique is decisive. What is decisive is the right time to operate. We have proved that we can restore even the most contracted joints but we do not know what to do to prevent them.

So, if you're going to mobilise calcium for whatever reason, which is not understood, this is the place to get at it. The blood supply is still there and you can mobilise the calcium. As for the level of injury, sir, I haven't got the exact figures in my head, I'm afraid. Some were incomplete lesions of the cervical region but some were low thoracic lesions, and they are active and use their arms. So, I think there's something going on generally, metabolically, which we were able to show.

DR. A. ROSSIER (*Switzerland*). In answer to Dr. Walsh's question: there has been no special operative precaution other than the one we are using. We didn't have one single post-operative infection—touch wood—out of 11 operations! As far as calcium in the urine is concerned, I have the same experience as Chantrain has, and others too: the calcium follows the same basic pattern as hydroxyproline urine—in other words it increases as hydroxyproline urine increases and it decreases as the latter decreases—more or less the general curve.

As to Dr. Zrubetsky's question about when we should operate; I don't think I have made it quite clear in my speech. The first goal of our study was to find out when to operate. The answer is, when all the parameters, which I have shown you today, have come to a normal line, the most reliable one being the SR 85 or 87 M. I have to make my point quite clear. I had recurrence when the alkaline phosphatase was normal and had been normal for 3 months. That is why it is not a reliable parameter. Per centra, up till now I never had a recurrence when the strontium was normal. That is why this is the only parameter which is left up to now 100 per cent. and if I can say so it's certainly not 100 per cent.