

General Discussion to Papers of Dr Shrosbree and Mr Scull

Chairman: Professor A. Rossier.

I open the discussion. Mr Harris.

MR P. HARRIS (*G.B.*). I'd like to ask Dr Shrosbree one or two questions. First of all to compliment him on his important and fascinating paper. I want to know please about the time aspects when the reduction was carried out in relation to the patient's injury. I think this is very important indeed regarding the success of the reduction, whatever method is employed, and one would hope that the best method was being employed whether it was closed or very occasionally open. I think also this is important in relation to the success of the reduction whether it is a unilateral or bilateral dislocation. Secondly, what was the technique and the result, and thirdly were there any re-dislocations, fifthly, the reason for non-reduction. Why couldn't reduction be obtained? I wonder if you would care to comment briefly on Alf Breig's work. His new book is just out on the Biomechanics of the Spine and he touches on quite a lot of the stuff that he has been telling us this morning, and another point is that in his in-vivo studies I hope that he would please include studies such as evoke potential studies and H. reflexes.

DR R. D. SHROSBREE (*S. Africa*). As regards to your first question, the time, we have a distance problem in our Unit. We fly in cases from 600 to 700 miles away so there is obviously a delay. We get them in as soon as possible and we try to reduce them as soon as possible, I think I would best answer your question by giving you our method of reduction, which is, if we get the patient in within the first 24 hours, we immediately put him on Crutchfield tongs and then we try to reduce them under anaesthesia. Over a period of 24 hours we increase traction by weight by 5 lb every half hour going up to approximately 25 lb and if there is no reduction we may then attempt reduction under anaesthesia. So it varies in time, it varies from 24 to 72 hours. The longest case was 3 weeks, we got a case in 3 weeks after the injury and in fact the unilateral dislocation slipped in very easily, and remained so.

MR P. HARRIS. The point is that what you said in relation to the results the benefit of reduction, the earlier reduction produces better clinical results, this is from a practical point.

DR SHROSBREE: Yes, unfortunately I haven't analysed the figures completely. It was very difficult to extract all the details because quite often the patient can't tell you and the doctor didn't tell you when the accident took place. Quite often the doctor was the only general practitioner in a big area and he got the case very late, they might have been injured at home and, so there is a problem in getting the final details in our situation. With regards open reduction only a few cases had open reduction and there was no improvement, and the reason why open reduction was done was that we couldn't reduce the case and we decided to attempt open reduction in spite of all our previous experience in spite of all literature which said it didn't help, we tried and we abandoned it after two cases.

MR P. HARRIS: When was it done in relation to the injury?

DR SHROSBREE: Within 3 to 4 days.

DR HARRIS: That's too late. You want it in 2 or 3 hours.

DR SHROSBREE: Well we don't get them in 2 or 3 hours afterwards. Your third question is delayed dislocation which I didn't quite understand.

MR HARRIS: I mean after a year say. Have you had any re-dislocations in any of your patients.

DR SHROSBREE: No we haven't.

MR HARRIS: You followed them up?

DR SHROSBREE: Yes. None of them, because we X-ray in 3 months. The last question as regards non-reduction. Quite often the cases were too ill to do anything.

They had respiratory problems, etc., and we couldn't reduce them and the others that were unreduced had associated fractures of the sets which made it impossible to reduce them.

SIR LUDWIG GUTTMANN (*G.B.*): Mr Harris has opened a rather difficult point again when he demands that the operation should be done within 24 hours. Really this is contradictory to experience of people with great experience. I think it is high time that we make it quite clear to neurosurgeons, orthopaedic surgeons to rush in into operations is utterly wrong. The report we have just got from Dr Shrosbree and his colleagues just proves the point how important it is to try first the conservative treatment and not rush in in bloody operations.

PROFESSOR ROSSIER: I know that you have to answer. I can imagine.

MR P. HARRIS: I'm sorry Mr Chairman, that was not my point at all. My point is that I feel personally that reduction of the dislocated cervical spine should take place as soon as possible after the injury, and I didn't say open reduction, I said reduction. That is the point.

PROFESSOR ROSSIER: And I will back you up on this point. I have just one question. I have a third question. If I understand you, you said that unilateral dislocation with complete lesion initially as soon as you could assess it, whenever they were reduced you had some improvement am I correct on that?

DR SHROSBREE: Unilateral had no improvement. Bilateral had some improvement.

DR P. DOLLFUS (*France*): Here again I make a plea that we should be more than cautious against early surgery, as papers in France have been published on the neurological aggravation following too hasty surgery. I'd like to ask you, do you consider as conservative treatment post-reduction under anaesthesia and have you seen after reduction under anaesthesia and control television image any neurological damage?

DR SHROSBREE: In reply to your question Dr Dollfus, no we have not seen any deterioration after anaesthesia and reduction. We do consider this a conservative form of therapy. This is just our opinion. As I stated before our treatment is conservative and we consider this as conservative therapy, and coming back to the open reductions, we didn't do these for neurological improvement. We did them merely to re-establish the orthopaedic situation and we were so disappointed with the actual open reductions that we only did two and abandoned it and we have never done any since. This is just our experience. Our orthopaedic surgeons and our neurosurgeons are very loth to go in.

PROFESSOR ROSSIER: Could I ask you something because I think it is very important for us that you know this. If I am logical with what you say with your experience and with the experience of many of us here, that unilateral dislocation initially complete will not improve whatever is done, does it mean that we should leave them unreduced if they cannot be reduced non-operatively? Sir Ludwig can you answer this question?

SIR LUDWIG GUTTMANN (*G.B.*): Whether unilateral or bilateral blockage that is not the point, the point is the neurological examination and the symptoms which develop and that can be only done by observation and not just by rushing in to do an operation. Mr Harris has modified his statement before and I'm glad that he did and he said the reduction should be done as soon as possible. Now as we heard from our colleagues they get cases say after 2 days or later due to travel over long distances, and then they start a reduction. Of course it is still the time to do it, to try first the conservative reduction and consider later operative procedure if necessary, if the spine remains unstable.

PROFESSOR ROSSIER: Dr Gregg and then Dr McSweeney second.

DR T. GREGG (*Eire*): I would just like to mention that following Dr Key's paper two years ago, that we have done a small number of reductions under anaesthesia, and I'd just like to record that in one case the patient was worse after it. We tried to be very careful but in one case there was a rise in the lesion by a segment and the biceps which was strong before was not afterwards.

MR T. MCSWEENEY (*G.B.*): This is obviously a discussion which could go on for days. First of all I'd like to congratulate Mr Shrosbree on a very excellent paper. I think at Oswestry we are more or less walking hand in hand with Dr Key and yourself. One small point was the question of unilateral versus bilateral facet dislocation. Well

the truth is the so-called unilateral may well have started. The second thing is as Sir Ludwig pointed out, it is the neurological examination which right from the beginning determines what is going to happen. Now on a point of pragmatism, and I am sorry to bring personalities in but it is obviously a personality discussion, if you say you are going to do a conservative manipulation or a conservative long axis traction that is a surgical procedure. Now its the question of the timing as to when, if it fails, and I'm faced with this dilemma perhaps three times a year, we admit about 60 acute cervical spines. Three or four times each year I'm faced with the dilemma at the 4th day that my colleague says to me, 'This fracture dislocation is unreduced'. Now we are at day 4, do we continue what we set out to do, by definition we put traction on to secure reduction, do we abandon reduction now, and I find this an extremely difficult question to answer. My preference in fact at the time is to proceed to open reduction. Now one other small point, you did say if I understand it correctly that you didn't have late instability. Now I suggest you look back on your cases again. There are a percentage which inevitably will fail to consolidate.

DR SHROSBREE: I did not say that we got no late instability I said we had no deterioration in the neurological picture.

MR P. HARRIS (*G.B.*): Sorry to chip in, you did not say that with respect I asked the same question, you said you had no late re-dislocation.

DR SHROSBREE: No, I differentiated between instability and re-dislocation. Re-dislocation to me implies relocking of facets. Instability implies that the patient has movement on flexion extension.

MR HARRIS: It could be subluxation.

MR McSWEENEY: We must not introduce the term subluxation because it is an entirely different thing, it is an anatomical situation where the facet joints are partly in contact but not fully without contact. Now the thing is, you've made the point not to equate neurological deterioration with instability. One is a neurological feature and the other is a ligamentous osseous feature, but point to you was I understood your answer to Harris's question, was that you never saw late instability. Now I think that's wrong.

DR SHROSBREE: We do.

PROFESSOR ROSSIER: I can assure the answer is they do.

DR SHROSBREE: That's right.

PROFESSOR ROSSIER: And my answer is now we stop, because I must give the occasion to the other speaker to be able to answer any questions to Mr Scull.

MR E. R. SCULL (*Australia*): Sorry, if I could quickly answer Mr Harris. He asked about reference to Brigg's work and of course this is a very fundamental work, particularly related to the subtle interaction between the cord and the spinal canal, as it goes through these movements. I think that if we do get involved in-vivo testing, and perish the thought, it has become very complicated in trying to do it in-vitro test. There is no doubt I think about response, it is a very useful technique for perhaps monitoring the neural property of the cord while we are doing these tests on it. Now how you grip the cord and not interfere with it so that you can do the test makes for a very difficult experiment. We've got some ideas but we've got to get this one under our belt first.

PROFESSOR RABISHAUM (*France*): Why don't you use a complete specimen including vertebral column in order to see what would be the difference between the specimen of spinal cord only and the attachment of roots, blood pressure, because it is surely a very important problem for the dynamic response of the spinal cord. Have you tried that?

MR SCULL: The answer is the way this whole work came up was a neurosurgical colleague was rather frustrated by being bundled out of court on a whiplash case and suggested that we throw a cadaver down the hospital stairwell and measure something on the way down, which made for a very complex experiment. What we found was that we want to get some of the simple properties the constructive properties built up as we go along. Now if you start with a very complex I agree you get an answer, but its very difficult sometimes to relate all the parameters as they are determined by each of the particular tissues and the elements within the system. I agree with you that's right, we've got a restriction in the size of the experiment at the moment but, yes I think this is one of

the useful next steps to build our understanding as we go along. We built a rather small brain and we had to start with the simple elements and build up our model.

PROFESSOR ROSSIER: There is still time for another question.

DR B. ANDREWS (*G.B.*): Could you tell us if you've had any experience of impulsive type testing as this would appear to be more appropriate and are you limiting your model to a linear model?

MR SCULL: The point about impact is a relevant one. Each of the individual experiments is qualified by what is ostensibly an impact test just before it which is a step input to determine its free vibration. We haven't used that as a part of the experiment, as an integrated part of the total experiment. The Fourier transform techniques we are attempting to use are in synthesising the input/output data. In terms of building the mathematics of the model we have not really gone into that at this stage—hence it is a preliminary report.