

**Discussion on papers of \*W. van Woerkom-Eykenboom and R. Braakman;  
\*N. Watson; \*A. Terry *et al*; F. Jenik *et al*; H. J. Hachen; G. M. Pool; and J. Baum  
and A. Alba.**

*Chairmen:* MR E. R. GRIFFITHS (*Australia*)  
DR A. G. HARDY (*U.K.*)

DR BURKE (*Australia*). I wish to follow Dr Pool's line of thought somewhat on psychological grounds. None of the other speakers really discussed this aspect of the patient, and I wish to ask them if they have observed a difference between the psychological coping mechanism of the non-traumatic group against the traumatic group. In Melbourne we feel that there is a difference, in that the non-traumatic patients seem to find greater difficulty coping psychologically with their disability. There are a number of theoretical reasons for this: the trauma patient has a sudden explosive episode which is explained to them as a lay person why they have suddenly become paralysed. There is often a difficulty of diagnosis in the non-traumatic group, which is hard for the lay person to understand. Some may not have a clear diagnosis. Unsuccessful treatment with drugs, going over some time, or unsuccessful surgical treatment can make it difficult for a patient to cope well psychologically. They don't have time to grieve in bed as the traumatic patient does, because they are suddenly thrown into a rehabilitation programme when they arrive at the centre. Their admission to a special centre for rehabilitation is often delayed. They may have progressive disease or progressive neuropathy. They are older and they are more likely to have an incomplete neurological lesion, and certainly in our experience those with an incomplete lesion have more difficulty in coping than those with a complete lesion.

DR SARRIAS (*Spain*). I wish to ask Dr Watson about the admission of multiple sclerosis cases, even if it is only for the treatment of various specific problems. We admit such patients and find that it may be difficult to discharge them afterwards.

DR WATSON (*U.K.*). We are very reluctant to admit cases of multiple sclerosis for general rehabilitation and general nursing care. We admit them specifically in particular for management of bladder problems, and secondly for management of spasticity. But the problem is, as Dr Sarrias has said, to get the patient back to his previous practitioner, and I make the point that these patients should be looked after by neurologists; we accept a patient for specific treatment and then refer the patient back to another department for further care. Otherwise, your Unit will be completely flooded out with cases of this nature. Now, unfortunately or fortunately, I have a urological colleague who tends to be rather kinder than I am, and he tends to accept the patient for management of the bladder and then finds himself saddled with the patient's care—not only the bladder, but every other kind of care, for several years to come.

MR GRIFFITHS. I would agree entirely with Dr Watson. In our unit we have the same problem, and we now insist that the patient remains in the neurological ward and we attend there and send our urological team to that area; otherwise as he says, these cases are so frequent, one can fill a trauma unit and have no room to take in the acute young trauma patient with a good prognosis.

DR REZAIAN (*Iran*). I have come across a few patients with von Recklinghausen's disease, which, if their management is neglected, will develop a spinal cord lesion causing paraplegia, and sometimes tetraplegia. I have also seen two patients with paresis due to idiopathic scoliosis in the thoracic region, and I have not come across this in the literature. I wonder if the speakers in their studies have seen this lesion?

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DR WATSON. We have had both of these problems. In Sheffield we are dealing with about 600 cases of non-traumatic paraplegia, and as my slide showed I think three patients had von Recklinghausen's disease. There are very few patients with idiopathic scoliosis who develop paraplegia, and they are included in our series but they are rare.

DR MINAIRE (*France*). We have one or two cases of idiopathic scoliosis, but they were not included because we wanted to compare a population coming from the same administrative region, thus they are included in the full series. Regarding Dr Burke's question about the psychology of these patients, we feel that there is a difference, but the main difference is seen in the patients with progressive disease. They present a different problem and we are not able to cope well with such patients at present, and this may be because in France such patients do not know what is occurring with their disease, and it is not possible to have proper rehabilitation. Thus we try to avoid the admission of multiple sclerosis patients and they remain in neurological wards; the same holds good for those with malignant tumours of the spine.

PROFESSOR PAESLACK (*Germany*). I was surprised to find that there were no reports of spina bifida from the speakers. I would ask Dr Watson if in the last few years he has seen an increasing number of spina bifida patients among the non-traumatic cases.

DR WATSON. The original concept of this session of the meeting was acquired non-traumatic paraplegia and I therefore excluded spina bifida from my paper. But in Sheffield, as you know, there is a world famous centre for spina bifida, and we are now accepting patients from the age of 16 years, and the treatment of such patients will involve us greatly in our programme for the next 20 or 30 years. Regarding Dr Burke's question, we do not have a psychologist on the staff of our Unit at Sheffield and we try to avoid questions about psychological attitudes. I am afraid I am a coward in the matter, and I prefer to leave things below the surface and not bring them out into the open where I feel they can often do more harm than good.

DR SILVER (*U.K.*). It is quite clear from what we heard that the non-traumatic patients are in an older age group, and obviously have different reactions and patterns of rehabilitation to those of the traumatic ones. All these excellent spinal traumatic units have been set up and for various reasons people seem frightened or unwilling or worried about treating the non-traumatic ones along with the traumatic ones, either because they will get landed with the cases, or that they don't seem to react so well. Where do the panel think these patients should be treated? I am concerned because I see how the non-traumatic ones are often very sad and miserable when they see how well the traumatic ones do, and they see their own progress as slower; they often grieve and say 'Why can't I be doing these things?' If one has an ideal system, where should one treat these patients? In the same hospital? In different wards? In the same wards? Or in a different hospital? Where would be the right place to treat these patients, forgetting about the discharge problem or that you might get landed with them?

DR SELL (*U.S.A.*). I disagree to some degree, Dr Silver. I think that paraplegic patients with a non-traumatic aetiology should be treated in units established for the spinal injury patient, and from the psychological viewpoint they progress fairly well; the outcome is better than that of the traumatic patient, not worse, and their stay is shorter not longer. I think the key is probably a psychological approach, that you have the patient admitted with a very specific goal in mind right from the beginning, even if he has a metastatic tumour of the spine. Your goal is to treat the bladder as best you can, and get him to the point where he can act as independently as possible at home. I agree that with multiple sclerosis you may have a different approach, but again you require to have a specific goal. We admit these patients not only for bladder care, but with the specific goal of well-trained independence if the patient has reached the stage where he cannot ambulate any more. When this goal has been reached they may then try to bargain to stay longer but you must be mature enough and tough enough to call it quits. You will not over-clutter your units with such non-traumatic lesion patients because they are limited to about 30 per cent of your cord disorder non-traumatic group, and they are discharged much faster.

MR GRIFFITHS. It is better that the 'non-traumatic group' should be treated as a whole with the 'trauma group' of patients, and that is what we manage to do in the vast majority of cases in Perth, West Australia, where we have 40 per cent of non-trauma and 60 per cent of trauma. We treat them in exactly the same way, as best we can with an optimistic outlook and aggressive approach, and discharge them home as soon as possible, so that whatever short life expectancy they have, they may have it in their home with as much rehabilitation as we can give them. This is not possible in many units which are restricted by virtue of bed shortages to trauma only, and I know this is the case in many units in Australia. This is perhaps unhappy, and emphasises the need as is stated in the National Data Research Centre in Phoenix, Arizona, of not 20 beds per million, but 50 per million, to take into account both the trauma and non-trauma patients. This would be an adequate supply of beds to care for both types of patient, who present so many similar aspects of care.

PROFESSOR ROSSIER (*U.S.A.*). Dr Watson, if I am correct, under your sub-headings, you had one mentioning myelopathy. I am quite unclear about this diagnosis. Vascular insufficiency of the spinal cord can lead to myelopathy. I would like to know what is your exact definition in your categorisation of myelopathy. The comment about the psychologist is well taken, but it should also be remembered that such a specialist can be very useful to the staff as well as the patients.

DR WATSON. The word 'myelopathy' is a bad word to use, and I apologise for using it. What happens is that you try to make a diagnosis with the various methods you have, but you always end up with a residual number of cases of spastic paraplegia or tetraplegia in which the myelogram is normal, and the other various investigative procedures you are able to carry out do not allow you to give an accurate diagnosis, nor does the history of the episode lead you to suspect one particular diagnosis. These are the residual cases of spastic paraplegia or tetraplegia where you cannot make a definitive diagnosis, and are those I have called 'myelopathy'.

MR GRIFFITHS. Regarding the paper by van Woerkom-Eykenboom and Braakman, I do not remember any mention—in the management of certain epidural spinal neoplasms—of changing the hormonal environment of those tumours which we presume to be hormonal based—those of the breast, the prostate, and so on. Was this in fact included in the treatment?

DR VAN WOERKOM-EYKENBOOM (*The Netherlands*). Yes, patients known with carcinoma of the breast and prostate and known widespread metastases, also have hormonal or chemotherapy.

MR WILLIAMS (*U.K.*). In Europe we rarely see patients with arachnoiditis, such as have been described so well by Dr Jenik. The majority of arachnoiditis cases that I see are predominantly cisternal and not due to birth injury. I think that they probably reflect the same basic pathological abnormality which causes the hind-brain herniation. We sometimes see large cysts at the lower level of arachnoiditis. I believe that it is important to empty the cysts, and for that reason it is important to establish whether the spinal cord is expanded or is contracted. If it is expanded I believe it should be explored through a long laminectomy, and should be drained; not necessarily into the subarachnoid space, perhaps better to the pleural or to the peritoneal cavity, and I am certain that in some of these patients there will be worthwhile improvement.

PROFESSOR BRAAKMAN (*The Netherlands*). I have a question concerning the most interesting paper of Dr Jenik. His title is that 'arachnoiditis as a cause of', and I wonder whether he can substantiate that opinion. Is it a concomitant sign of a disease, or is the arachnoiditis the cause of it? I have a comment on the statistics given during this session concerning the percentage of non-traumatic cases. It would appear to me that in the majority of patients with paraplegia the cause is not trauma.

DR JENIK (*Switzerland*). The clinical picture was that of a spinal cord syndrome, but what I would like to stress is that it was a syringomyelic type of disorder, which was somehow neglected in all Asian and African countries. The first paper to outline this was that of Ransome and Montiero (1947), since practically forgotten and again revived now, but there are syringomyelic associated sensory disorders. Adhesive arachnoiditis

as was seen in Ethiopia and mentioned in my paper, appears most likely to be due to some form of infection, and this infection may be syphilis, but more likely tuberculosis.

MR GRIFFITHS. Regarding Mr Williams' comment, that many of these patients may have a syrinx that could possibly benefit from decompression. What is your comment, Dr Jenik? Five of your patients had a laminectomy; was it found? And was a bypass operation carried out at the same time?

DR JENIK. Yes. In all five cases there was cavitation, and arthritic changes at the same place, but the pathological study was limited; from one patient dura was taken for biopsy, and arachnoiditis was confirmed.

DR HAMZA (*Egypt*). In my country, during the past three or four years I have not found any evidence of spinal arachnoiditis due to syphilis or tuberculosis except in one patient who was found to have spinal tuberculosis and developed syringomyelia in the dorso-lumbar region.

DR FRANKEL (*U.K.*). I wish to take up Professor Braakman's point concerning common causes of paraplegia. I believe that the incidence of paraplegia and tetraplegia due to malignant disease is probably higher than that of trauma. The prevalence, of course, is quite low because such patients do not survive for long. I wonder what place the expertise of the general membership of this Society has in helping these patients who may live for a few months or possibly a year or more. I think they can be helped but there are great problems in admitting them into our own facilities because the whole emotional background on which we base our work with traumatic cases is that a disaster of great magnitude has occurred, but at least the neurological condition is probably not going to get any worse. They are going to live a long time, and with rehabilitation commenced in the first month, with a likelihood of some improvement. When one of our old patients, well known to the unit, is dying of any cause within the unit, there is a great sorrow and wailing amongst all the patients. The whole unit is broken up by the imminent death, and then the death of such a patient. The patients and the staff, particularly the nurses, are not attuned psychologically to 'handling death', and in fact I think perhaps if they were attuned to it they would be disabled from handling the other patients. Thus personally I feel that our roles should be educational and supportive; that the people from other centres should visit us to learn; and that we should go to those centres to teach, but should not, by and large, admit this large number of patients to our units.

MR GRIFFITHS. Thank you Dr Frankel. Regarding the policy with patients with paraplegia due to malignancy in our unit in Perth, Australia, such patients are selectively admitted. We try, if possible, to educate our colleagues *not* to wait until the patient becomes paraplegic, but to refer the patient at the stage of paraparesis. You can sometimes assist these patients, not by carrying out a laminectomy, because the lesion often involves the vertebral body and not the neural arch. We would go anteriorly if there is an isolated lesion in the vertebral body, proven by C.T. scan and myelography. If you take away the neural arch the spine becomes unstable. Therefore we would go in anteriorly, remove the body, and put in a strut. If the cause is a malignant neoplasm we would use methylacrylate cement such as is used in hip replacements, possibly put in a fibular strut with this cement, and we abort the paraplegia when at all possible. We have done this now in some 30 or 40 cases, and I read a paper on this series in Taiwan in May 1979. I did not see in Professor Braakman and Dr van Woerkom-Eykenboom's paper mention of this anterior approach; the operations were all laminectomies. Is there a case for anterior stabilisation for the metastasis in the body and not in the neural arch, where destruction of the neural arch by laminectomy will only make it more unstable? Could Professor Braakman please reply to this question?

PROFESSOR BRAAKMAN. I fully agree. In our series we have no experience with the anterior approach, but hearing about it and working together with our orthopaedic surgeon, we carried out an antero-lateral approach in our last two patients.

MR GRIFFITHS. Thank you Dr Braakman, that was the very point I wished to make. We select the surgical approach according to the pathology. There is no point in taking away a normal neural arch when there is pathology of the vertebral body.

DR REZAIAN. About 4 years ago a lady was referred to me with intractable pain and paraparesis. X-rays showed a lesion of the body only of T<sub>5</sub>, and all other studies were negative. I operated on this patient anteriorly only, and removed as much of the tumour as I could, and put in a graft from the fibula. Dramatic relief was achieved. She has now survived about 3 years, healthy, without pain, and the tumour proved to be a solitary myeloma. I have had two other patients, one with a myeloma and one with a synovial sarcoma. These patients are under special treatment in the Institute de Pasteur in Paris.

DR POOL (*The Netherlands*). My hospital is adjacent to the cancer hospital in Rotterdam. I would suggest that the point raised by Professor Braakman may be brought up as an item for a future meeting. It may be that there are more people with paraplegia from non-traumatic causes than from traumatic causes.

MR GRIFFITHS. Thank you Dr Pool. I think you are most likely correct. The point still remains, as has been mentioned by Dr Frankel and earlier by Dr Burke that unfortunately in many countries the number of beds available for spinal work is just barely adequate for trauma patients. I know that many units cannot admit the non-traumatic cases because they are already taking an overload of those with trauma. Another point of Dr Frankel's was that trauma cases have at least an expectancy of life. They are a younger age-group, with the expectancy of a good life-span and a very low mortality. Once one admits the more ageing group of patients with a shorter life-span, the atmosphere of the unit changes, both regarding the staff and the other patients. We ourselves take a fair number—I would think almost 40 per cent of our cases would be non-trauma—but we do not admit those with gross metastatic invasion of their whole body; we take the ones we can help. If rehabilitation is likely to help we admit such patients and discharge them very quickly. I think it is important that the little time they have left should be spent in their own home with their family. I think the figures from Professor Braakman's unit were that 36 survived for more than 3 months, so more than half will die in 2 or 3 months.

DR SILVER. Following up the point you were making, Mr Griffiths, we have heard about the psychological and the logistic difficulties, and there is also one very real medical difficulty and difference between the non-traumatic and the traumatic patients, especially where the pathology is one of malignant disease. There is considerable incidence of septicaemia and bacteraemia in the medical cases. I read a paper before the Society many years ago, on septicaemia, and this occurred almost only in the non-traumatic cases. Such patients have been poisoned with steroids, cytotoxic drugs, and irradiation, and have far less resistance to bacterial infection. This is demonstrated if blood cultures are performed, and although many of them don't seem to be particularly ill they obviously have a bacteraemia. They also appear to have a high incidence of amyloid disease, resulting from their immune system being assailed from several different sources.

DR FREEHAFFER (*U.S.A.*). I wish to comment on what Dr Frankel brought up. I think this is an important point. I was involved in my unit in the Cleveland area with a rehabilitation programme for cancer patients for about 3 years. Cleveland has all the resources within the community to take care of almost all of our medical problems. At first we met with a lot of resistance from individual groups because they said that full treatment was available, and admission to a spinal unit was unnecessary and redundant, but in practice it is not. Expert rehabilitation is not only useful in society but eventual preparation for death is vitally important, and also preparation to have the patient discharged from a hospital to his home. The whole endeavour in this programme in which we were involved is to get such patients out of hospital, using in a co-ordinated fashion all the available community resources in order to make these people's lives better.

DR BURKE (*Australia*). I wish to agree with the comments of Dr Frankel and Dr Freehafer. I believe that the patient with terminal cancer should be managed separately from the traumatic and perhaps the non-traumatic group. In our hospital we have a very good, though small, Oncology Unit with a specialist Oncologist who understands paraplegia very well. He takes these patients, rehabilitates them in the shortest possible time, and he and his whole team handle the dying patient extremely well. When we do

have the occasional problem in our own unit of a dying patient, the oncologist is the first person that we seek advice from. Another person we often seek advice from is the hospital chaplain. There is a hospital chaplain training programme in our hospital, and these young men and women are very good in handling the dying patient and family.

MR GRIFFITHS. Unfortunately I don't know what it is like in Holland, but most of the Western world is becoming less religious, and unfortunately the priest has very often given way to the doctor in advising the patient. I wish it were perhaps the other way as it would save us an awful lot of trouble.

DR HARDY. You realise that we are considering a very selected group of patients, because they are patients who have had operations for intervertebral disc disease, who have developed paraparesis or paraplegia. The comments that we have had from our speakers will, I am sure, provide potentially provocative statements from both orthopaedic and neurological surgeons.

DR WALSH (U.K.). I should like to know how many patients had disc operations during the past 30 years *without* any ill effects? I wonder if these figures are available anywhere to anyone's knowledge?

MR WILLIAMS. I feel somewhat exposed, and I would say that neurosurgeons are well aware of some of the difficulties present in some of these patients. One of the greatest problems we have indeed is diagnosis, and there is a single case that Dr Terry mentioned—the lady with crutches. She was a case I operated upon and made worse but I had no idea that she had a dorsal disc protrusion. This is the problem when you see a myelographic filling defect which is mainly lateral, or when you get no changes in the disc space itself to indicate that this is not a tumour. These are the problems that one faces as a surgeon. Neurosurgeons are very well aware that in spinal units we see such patients by virtue of their special selection. I for one find it very hard to think that just using the word 'laminectomy' which to me means taking the lamina off can actually cause serious neurological damage although it must do something. There is something more to it.

DR REZAIAN. Before I give my comment, I would like to answer Dr Walsh. Several years ago a French surgeon said that a tissue which is incised is never the same again; therefore you cannot expect patients who have undergone an operation to be completely normal. Many patients get better spontaneously even if they have had 3 or 6 months with pain, or atrophy of a leg. It is not easy to diagnose dorsal disc protrusions; a congenital, or vascular lesion, or some other pathology may have been considered. It is most important not to approach such dorsal disc protrusions by a posterior approach. The best way at present is probably an antero-lateral approach, and at the same operation to decompress as well as to fuse the spine, as otherwise complications may arise and the patient may develop kyphosis.

MR MCSWEENEY (U.K.). I am an orthopaedic surgeon, and I do not think that my good friend Mr Bernard Williams needs any defence from me. Some of my best friends are neurosurgeons so I thought I should say something about this problem. As Dr Terry emphasised in spinal units we see the worst results; we see a selected group of patients where something has gone wrong. The point really is that many of these people, if they had not been operated on, would probably have progressed to a paraplegic state in any event. I take the last speaker's point that some do improve, but the difficulty is to forecast which particular patient is going to deteriorate and which is going to improve when you see him at the first consultation. Obviously the wise man will wait for a time and see what happens. It is easier and better if the surgeon can be certain of the diagnosis, but as Dr Terry said, in many cases we do not really know the diagnosis at the time the patient presents. Previous speakers have emphasised that a posterior approach for dorsal disc protrusions is by and large unsatisfactory. An anterior spinal approach for other conditions, notably tubercle, is again not all plain sailing, so I think we are faced with a problem that does not have a simple, immediate answer. But I feel that with improved diagnostic studies, (and improved surgical technique,), maybe some of the terrors will be mitigated in the treatment of this very difficult condition.

MR GRIFFITHS. I think the whole problem here is neither with the surgeon nor

with the technique. The obvious technique that is best is an antero-lateral one, but the major problem is the vascular supply. These dorsal disc protrusions occur at the watershed level of the thoracic spine. It is an anterior compression; we know the problem is a difficult one and that, for example, fractures in this region anyway carry a bad prognosis. I think the die is cast when the paralysis commences. From then on with or without interference, it is the vascular problem that predominates. I think that any form of exploratory surgery which should preferably be an antero-lateral operation still carries a distinct risk. This is not bad surgery, but relates to the patho-physiology, which is a vascular one. I think one is lucky to get away with even very gentle, very delicate surgery. Still the vascular problem remains, and until we solve that I think that some of the results are going to be bad.

DR FRANKEL. Regarding Mr Griffith's remarks, I do not think our findings confirm what he is suggesting. I am assuming that the natural history of intervertebral disc lesions is still proceeding in England, and that some people are still seeing cord compression from disc protrusions, but they are no longer being paralysed by them or else we would be getting them. I agree we are collecting them 'at the far end', therefore, I think something has happened. I believe that there has been a change in both neurosurgical procedures for the dorsal spine, and the orthopaedic practice on the lumbar spine, and tragedies are now extremely rare. Each spinal centre might only have one tragedy in a decade, but we collect all those from the South of England sooner or later, and we can inform neurosurgeons and orthopaedic surgeons that they are probably doing very well now. I agree that there are vascular problems, and Grandserhoff, I believe for a time did selective arteriography on every case to identify the major vascular feeders, but he was getting quite good results even before he did this. Therefore this is not an attack on orthopaedic surgeons or neurosurgeons, it is a compliment to them.

MR WILLIAMS. I think that the general tone of this meeting has been that in spinal units you accept acute cases, and are reluctant to take patients who have a gradual onset. You are not sitting in our outpatients' departments seeing patients who are becoming paraplegic slowly because the surgeons have been nervous to operate. Although I am very much in sympathy with Mr Griffiths' remarks to the effect that when these patients start getting paraplegic the die is cast and a great number of them continue to get worse. The fact that we do not send them to paraplegic centres is because (with their gradual onset), after operative treatment they usually improve and progressively adjust to their disability so that they do not require intensive rehabilitation, but these dorsal disc protrusions can cause serious neurological lesions and I am not at all sure that we are doing much better than we used to do.

DR SILVER. Dr Walsh asked a very relevant question; the number of laminectomies done and the incidence of neurological deficit afterwards. The only study I know of is that of Levere who made a study of all the laminectomies carried out in the United Kingdom for patients with lumbar disc lesions, and some very interesting figures came out. Although neurosurgeons did many more laminectomies than orthopaedic surgeons, because there are so many more orthopaedic surgeons operating than there are neurosurgeons, the majority of laminectomies for disc protrusions in the lumbar region are done by orthopaedic surgeons, each carrying out very few operations, maybe half a dozen a year. Each neurosurgeon was doing 30 or 40 such operations a year. It seems that the incidence of complications was rather higher, in fact considerably higher with the occasional orthopaedic operator. This study, in the *British Medical Journal*, was limited to lumbar discs. I do not know of similar figures for patients with thoracic disc protrusions.

MR MCSWEENEY. I think we should be very clear in our own minds that there is a profound difference between thoracic disc protrusions and lumbar disc protrusions. Levere's paper was published 10 or 15 years ago, and if you had read the follow-up he was very severely criticised, because like a statistical analysis in other situations it was falsely based. This is not to say that there are no tragedies with lumbar disc operations, but a serious complication from lumbar disc surgery is unique even among orthopaedic surgeons.

*Discussion on Dr Hachen's paper* ('Computed tomography in the assessment of non-traumatic spinal cord lesions: limitations and application').

DR HARDY. Thank you Dr Hachen. Your paper again illustrates the special selection of cases that are referred to spinal units and the occupational hazards of different disciplines.

MR WILLIAMS. I wish to congratulate Dr Hachen on his paper, and comment that we have recently reviewed all our syringomyelia patients with a view to seeing whether we could demonstrate the communication, and the result was that out of 100 cases there were only ten in whom we could show this, using both Myodil and water soluble contrast media. Unfortunately we do not have a whole body scanner where I work. I am rather jealous of people who are able to show that the contrast material does get inside the syrinx. I would like to know whether Dr Hachen thinks that the contrast fluid passes through the communication, or whether he believes along with Aublkere and others, that it may get in through the perivascular spaces. Following his attempt to show the communication and only achieving this in 10 per cent of cases, I feel somewhat ashamed at having introduced the term 'communicating syringomyelia', because I am now having to back-track and admit that on at least macroscopic radiological grounds most of them in fact are not communicating at the time that we see them. I think it is possible that they may have communicated at some stage and that now they are blocked off at the top, and the contrast material is indeed getting in, as Isbister has suggested, along the outside. I should be pleased to have Dr Hachen's comments on this problem.

DR HACHEN (*Switzerland*). This is very uneasy ground. I cannot answer the question because both routes may be possible. There may be a communication, depending on the speed at which the contrast material reaches the syrinx, but this occurs immediately after the injection, and if the concentration is high you would expect to have a direct communication if it takes 3 to 4 hours to obtain some small opacification that we have previously mentioned. Thus it may be that it goes right through the cord, but I think it is very hard to give an answer to this. The other point which I did not mention is the importance of the whole body scanner in diagnosing additional pathology. It was difficult to visualise C1 and C2 and it might be difficult to visualise what happens at C7 and D1. If you use the whole body scanner which cuts all the way down you cannot miss dislocations at such levels, and you may also find other pathology, such as retro-peritoneal haemorrhage; you may find a tamponade pericardial haematoma around the heart and haemomediastinum; you may diagnose small ruptures of the kidney which may initially go undiagnosed especially in a patient with multiple trauma.