COMMENT ON

doi: 10.1308/003588408X301154

M Crocker, G Fraser, J Wilson, E Boyd, J Wilson, BP Chitnavis, NW Thomas. The value of interhospital transfer and emergency MRI for suspected cauda equina syndrome: a 2-year retrospective study. *Ann R Coll Surg Engl* 2008; **90**: 513–6

doi 10.1308/003588409X428487

An algorithm for suspected cauda equina syndrome

NV TODD

Regional Neurosciences Centre, Newcastle General Hospital, Newcastle upon Tyne, UK

CORRESPONDENCE TO

NV Todd, Consultant Neurosurgeon and Spinal Surgeon, Newcastle General Hospital, Westgate Road, Newcastle upon Tyne NE4 6BE, UK. E: nick.todd@nuth.nhs.uk

Crocker and colleagues reported a total of 125 patients. Eighty-two patients had emergency admission for suspected cauda equina syndrome of whom 27 (33%) required a surgical procedure. Only five patients (6%) required emergency surgery.

Forty-three patients in the same 2-year period had a lumbar discectomy because of a cauda equina syndrome. Did those 43 patients include the 27 patients who required surgery following emergency magnetic resonance imaging (MRI)? It is difficult to reconcile the numbers. For example, 27 patients of the 82 who had emergency MRI required surgery which ought to leave only 16 patients (43 – 27) who required surgery following diagnostic imaging at another hospital whereas the paper quotes 32 of the 43 patients had diagnostic imaging from another hospital. Some of these difficulties clearly relate to the retrospective nature of this study which the authors recognise.

This study is an important contribution to the literature because the issues of (i) when and where to image patients with symptoms that might be a consequence of cauda equina compression (ii) when, or if, such patients should be assessed by neurosurgeons and (iii) when, or if, such patients should have a surgical operation is much debated and this is significant in relation to practice for all surgeons who see such patients.

Given the retrospective nature of their study, Crocker and co-workers were unable to identify the neurological status of their patients in any detail. This is understandable but, in fact, management decisions in this area are crucially related to the patient's neurological status at the time of primary diagnosis. May I offer the following facts at least as far as we understand them together with some conclusions which I hope would enhance the authors' observations and conclusions?

1. The commonest cause of difficulties in passing urine in patients with lumbar degenerative disorders is pain and not a cauda equina syndrome.
2. Despite that, where a patient with a lumbar degenerative disorder has difficulties in passing urine, that problem cannot always safely be attributed to pain alone.
3. There are a group of patients at risk of developing a cauda equina syndrome where there are 'red flags' including bilateral radicular pain and/or bilateral sensory disturbance, bilateral motor weakness and/or bilateral loss of reflexes. These patients do not have a cauda equina syndrome but they are at high risk.
4. Patients have an incomplete cauda equina syndrome (CESI) if they have subjective and/or objective evidence of neurological losses such as impaired bladder sensation, impaired urethral sensation, impaired rectal sensation and/or objective genital/peri-anal (S3–S5) sensory disturbance and/or reduction in anal tone, provided the bladder is still functioning normally.
5. Patients have a complete cauda equina syndrome when the bladder becomes paralysed and this leads to painless retention of urine with overflow incontinence.
6. Patients who do not have a cauda equina syndrome but who are at high risk should have urgent MRI; if there is a large central disc prolapse, they should have urgent surgery to prevent the development of a cauda equina syndrome.
7. If a patient has CESI there should be urgent, or possibly emergency, surgery to treat the patient prior to the development of CESR because outcomes in patients treated at the time of CESI are generally favourable, whereas outcomes following bladder paralysis are less favourable.
8. There is debate as to whether earlier surgical treatment following bladder paralysis (CESR) leads to better outcomes. Some believe that there is no benefit to prompt decompressive surgery following CESR.¹ Others believe that there is a window of opportunity following CESR. That window of opportunity may extend to 24 h after the onset of CESR,^{2,3} or it may extend to 48 h after CESR.⁴

Taking all of this into account, the following algorithm may be helpful:

1. A complaint of difficulty in passing urine particularly in the context of severe pain, with no subjective or objective neurological deficit: admit, pain relief and MRI the following day at the district general hospital (DGH). Very few patients will have a central disc prolapse. Those that do can be referred to the local spinal surgery service.
2. Those who are at high-risk of developing a cauda equina syndrome 'red flags' but who have no features of a cauda equina syndrome: the same management as above.
3. Patients with CESI (i.e. subjective or objective evidence of CES who do not have bladder paralysis): emergency MRI either at the DGH or at the local spinal service with urgent

or emergency surgery to decompress the cauda equina prior to the onset of CESR. There is on-going debate as to whether that surgery should be carried out as an emergency, out-of-hours, or on the next day-time list.

4. If, at the point of first assessment, the patient has bladder paralysis (CESR), the decision (as to whether urgent or emergency MRI and/or surgery is required) depends upon the surgeon's assessment of the medical literature. If the surgeon takes the view that there is no benefit to urgent decompression following bladder paralysis, there is no urgency for diagnosis and treatment. However, the fact that there is uncertainty in this area and the fact that some studies have suggested a window of opportunity extending to 24 h (or possibly 48 h) after the onset of CESR, suggests that perhaps the precautionary principle should be adopted and patients should be decompressed urgently on the basis that there is scientific uncertainty. Whether such patients should be operated out-of-hours as a true emergency is also a matter of debate.

I do hope that this clinical algorithm adds strength to the conclusions set out by Crocker and colleagues. I agree that many patients can appropriately have imaging performed promptly within the DGH but it is important that we have a selective approach to: (i) patients who should be initially managed at the DGH; (ii) patients who require urgent or emergency MRI; and (iii) patients who require urgent or emergency treatment.

References

1. Gleave TRW, MacFarlane R. Prognosis for recovery of bladder function following lumbar central disc prolapse. *Br J Neurosurg* 1990; **4**: 205–10.
2. Todd NV. Cauda equina syndrome: the timing of surgery probably does influence outcome. *Br J Neurosurg* 2005; **19**: 301–6.
3. Jerwood D, Todd NV. Re-analysis of the timing of cauda equina surgery. *Br J Neurosurg* 2006; **20**: 178–9.
4. Ahn UM, Ahn N-U, Buchowski MS, Garrett ES, Sieber AN, Kostuik JP. Cauda equina syndrome secondary to lumbar disc herniation. A meta-analysis of surgical outcomes. *Spine* 2000; **25**: 1515–22.

AUTHORS' RESPONSE

doi:10.1308/003588409X428496

MATTHEW CROCKER, BHUPAL CHITNAVIS, NICK THOMAS
Department of Neurosurgery, King's College Hospital, London, UK

CORRESPONDENCE TO

Matthew Crocker, Department of Neurosurgery, King's College Hospital, London SE5 9RS, UK
E: matthewcrocker@blueyonder.co.uk

We are grateful to Todd for his comments and observations.

He specifically asks about the numbers of patients in the two groups and the overlap, group 1 being patients undergoing emergency MRI for suspected cauda equina syndrome and group 2 being patients having emergency discectomy for clinically and radiologically confirmed cauda equina syndrome. The confusion perhaps relates to ambiguity over the term 'emergency'. We have studied group 1 as defined as patients having MRI out of normal working hours for suspected cauda equina syndrome, hence an emergency group. This will, however, miss a small number of patients from the local area who underwent an emergency MRI for suspected cauda equina syndrome during working hours using our own MRI scanner. The second group of patients we have defined as those undergoing unscheduled (*i.e.* not admitted electively) discectomy for cauda equina syndrome, some being done during normal working hours. True, 27 of the 82 patients having emergency (out-of-hours) MRI proceeded to surgery, but in only 5 of these 27 was the clinical and radiological correlate sufficient to warrant direct procession to surgery that night, hence a true 'emergency' case of cauda equina syndrome. This represents a difficulty of this retrospective study but, moreover, a difficulty which confounds much of the literature: specifically what does constitute the cauda equina syndrome? Certainly, the combination of perineal sensory loss, painless urinary retention and/or incontinence with unilateral or bilateral L5 or S1 symptoms as a consequence of compressive pathology in the spinal canal, typically a large disc prolapse, will qualify. However, the less clearly defined group of incomplete cauda equina syndrome patients are defined differently by different commentators.

The work presented represents a documentation of current practice and allows the assessing clinician and the on-call spinal service to understand what index of suspicion should be maintained for true cauda equina syndrome in this group of patients, prior to interhospital transfer for on-call MRI. It is strengthened by reading alongside the contemporary study by Bell *et al.*,¹ who found positive predictive values for a large central disc of around 0.6 for each of urinary retention, urinary frequency, urinary incontinence, altered urinary sensation and altered perineal sensation. Todd's proposed algorithm for attempting to identify the most urgent cauda equina syndrome patients from those who may reasonably be imaged the next day is a good proposition and it would be interesting to see it applied hypothetically to a cohort of well-documented patient episodes to test its strengths and weaknesses.

We agree that the timing of surgery is a matter of debate; we also agree, however, that, given the good outcomes seen following expeditious surgery for incomplete cauda equina syndrome, to treat this as a non-emergency matter falls foul not only of the somewhat weak published evidence but, more seriously, of medical and scientific common sense. We