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Lumbar puncture in spontaneous subarachnoid haemorrhage

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Abstract

Seventy-four patients with proved spontaneous subarachnoid haemorrhage were studied. Sixty-four underwent computed tomography and 55 underwent lumbar puncture. Seven cases deteriorated dramatically after lumbar puncture, six of these showing evidence of cerebral dislocation on further investigation. Four of the seven had not undergone computed tomography and three underwent computed tomography after lumbar puncture. Computed tomography of the brain could determine patients at risk of coning.

It is suggested that computed tomography is the investigation of choice after spontaneous subarachnoid haemorrhage and that lumbar puncture, if still then necessary, should be avoided until computed tomography has been undertaken.

Introduction

I attempted to assess the value and possible dangers of lumbar puncture after spontaneous subarachnoid haemorrhage and to assess the place of computed tomography in avoiding these dangers. The assessment was made as part of a survey of cases with subarachnoid haemorrhage admitted to the Royal Hobart Hospital over two years.

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Patients and methods

Only patients who showed definite deterioration at the time of lumbar puncture, with the needle still in site, were considered to have reasonable presumptive evidence of deterioration related to the lumbar puncture. There were several patients whose continuing deterioration after lumbar puncture might have been related to the pathological changes of subarachnoid haemorrhage, but these cases were not included. Signs and symptoms before and after lumbar puncture were described by using the classification of Hunt and Hess.¹

Results

A total of 74 cases with proved subarachnoid haemorrhage were admitted during the two years of the study. Sixty-three cases were admitted directly or indirectly into the department of neurosurgery and all of these underwent both computed tomography and angiography. The remaining 11 cases were treated in medical wards alone and only one of these underwent computed tomography. Fifty-five patients had lumbar puncture performed at some stage of their investigation and, though it was the policy in the neurosurgical unit to undertake lumbar puncture only if there was no evidence of haemorrhage on CT scan, in 44 cases lumbar puncture was undertaken before computed tomography.

Seven patients showed dramatic alteration in conscious and neurological state at the time of lumbar puncture. None of these had computed tomography before lumbar puncture. All underwent lumbar puncture within 12 hours of ictus. The table describes the change in classification after lumbar puncture, the diagnosis, and the ultimate outcome. The three survivors underwent operation for removal of clot, two for clipping of aneurysm, one angioma for partial excision. Necropsy undertaken in three of the four patients who died showed evidence of cerebral dislocation and tentorial and tonsillar coning. No necropsy was undertaken in the fourth, a patient who was conscious and alert with a dilated pupil at the time of lumbar puncture but who stopped breathing on the end of the needle. The three

Grading before and after lumbar puncture, diagnosis, and outcome in seven cases of dramatic alteration at time of lumbar puncture

Grading*		Diagnosis	Outcome
Before lumbar puncture	After lumbar puncture		
2	4	Angioma + clot	Permanent left hemiparesis
2	4	Aneurysm + clot	Gross disability
2	5	Aneurysm + clot	Gross disability
2	5	?Aneurysm	Died within 24 hours
2	5	Aneurysm + clot	Died within 24 hours
3	5	Aneurysm + clot	Died within 24 hours
3	5	Aneurysm + clot	Died within 24 hours

*Classification of Hunt and Hess.¹

patients who survived had undergone computed tomography, angiography, and operation as emergency procedures after lumbar puncture. All showed evidence of cerebral dislocation in association with an intracerebral clot.

Computed tomography was performed in 64 cases. In patients where aneurysm or angioma was present there was evidence of blood in 59 (92%) of those examined within three days and 48 (75%) of those examined within five days. Cerebral dislocation, as demonstrated by ventricular displacement, was found in 12 patients (19%) and in each case was associated with intracerebral clot. Five of the 12 underwent lumbar puncture and three of these deteriorated. There were five patients with intracerebral clot but no dislocation. Ten patients did not undergo computed tomography: five underwent lumbar puncture and four of these deteriorated.

Six of the patients who deteriorated after lumbar puncture were shown by computed tomography or at necropsy to have appreciable intracranial dislocation. Extensive subarachnoid blood or clot without dislocation were not related to deterioration after lumbar puncture.

Discussion

In 1908 Sergent and Grenet reported a case of subarachnoid haemorrhage in which death followed immediately after lumbar puncture.² The potential danger of lumbar puncture in certain cases of raised intracranial pressure is well recognised.^{3,4} Lumbar puncture is such a traditional investigation after subarachnoid haemorrhage that it may have been an unrecognised cause of deterioration—the coning precipitated by lumbar puncture. It seems unlikely that all of the seven cases described could coincidentally have had a further bleed at the time of lumbar puncture to explain the deterioration. The patients I describe showed a dramatic change after lumbar puncture but there might well be others, not recognised, with insidious deterioration owing to seepage of cerebrospinal fluid from the punctured theca in the hours after lumbar puncture. The patients described did not show obvious clinical evidence that dislocation might be present before lumbar puncture.

Modesti and Binet⁵ in discussing subarachnoid haemorrhage suggest that computed tomography may obviate the necessity for lumbar puncture in patients with increased intracranial pressure. Humphreys⁶ thought that there should not be an aura of fear surrounding lumbar puncture or reluctance to perform the procedure. He said that there were occasions when it is inappropriate but concluded that the impact of computed tomography had not appreciably altered the role of early diagnostic lumbar puncture. Disagreeing with Humphreys, Ivan stated that early diagnostic lumbar puncture is indicated only in the confirmation and treatment of acute meningitis and only if facilities for computed tomography are not available or if it does not disclose the cause.⁷ Scotti *et al*⁸ suggested that lumbar puncture should be avoided and that computed tomography should be performed as the initial examination. Findlay⁹ disagreed with Scotti because the restricted availability of computed tomography made the omission of spinal puncture impracticable. Adams¹⁰ said that lumbar puncture might be dangerous in a comatose patient, particularly if a large intracerebral haematoma was present, pointing out that computed

tomography could usually be undertaken before lumbar puncture.

The morbidity and mortality of subarachnoid haemorrhage have improved for the patient who is a good risk but not for the comatose patient.¹¹ Avoiding lumbar puncture as an initial procedure after subarachnoid haemorrhage may increase the number of patients who are a good risk. The potential danger of lumbar puncture in some cases after subarachnoid haemorrhage, the unreliability of a clinical determination of the imminence of cerebral coning, and the accuracy of computed tomography in showing blood and dislocation make computed tomography the investigation of choice after haemorrhage. If the computed tomography scan gives negative results lumbar puncture may be performed safely if still indicated. Most patients travel well after subarachnoid haemorrhage, and transfer to centres with facilities for computed tomography and surgical treatment should be undertaken; confirmation of subarachnoid haemorrhage should not be obtained by lumbar puncture before this.

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WINTER AND SUMMER SAVOURY. Both these are so well known (being entertained as constant inhabitants in our gardens) that they need no description.

Mercury claims dominion over this herb, neither is there a better remedy against the colic and iliac passion, than this herb; keep it dry by you all the year, if you love yourself and your ease, and it is a hundred pounds to a penny if you do not; keep it dry, make conserves and syrups of it for your use, and withal, take notice that the Summer kind is the best. They are both of them hot and dry, especially the Summer kind, which is both sharp and quick in taste, expelling wind in the stomach and bowels, and is a present help for the rising of the mother procured by wind; provokes urine and women's courses, and is much commended for women with child to take inwardly, and to smell often unto. It cures tough phlegm in the chest and lungs, and helps to expectorate it the more easily; quickens the dull spirits in the lethargy, the juice thereof being snuffed up into the nostrils. The juice dropped into the eyes, clears a dull sight, if it proceed of thin cold humours distilled from the brain. The juice heated with the oil of Roses, and dropped into the ears, eases them of the noise and singing in them, and of deafness also. Outwardly applied with wheat flour in manner of a poultice, it gives ease to the sciatica and palsied members, heating and warming them, and takes away their pains. It also takes away the pain that comes by stinging of bees, wasps, &c. (Nicholas Culpeper (1616-54) *The Complete Herbal*, 1850.)