

Letters to the Editor

Markedly increased levels of IL-6 and CA125 in pleural fluid of an elderly person with overlap syndrome of systemic sclerosis and systemic lupus erythematosus

SIR—The overlap syndrome of collagen diseases is not uncommon [1]. However, the anti-topoisomerase 1 (Scl-70) antibody and the anti-Sm antibody, which are specific for systemic sclerosis and systemic lupus erythematosus (SLE), respectively, rarely coexist [1, 2]. Although both SLE and systemic sclerosis can cause pleuritis, the aetiology of pleural effusion is not always determined in an overlap syndrome of SLE and systemic sclerosis [3]. Here we report such a case.

An 88-year-old woman was admitted with appetite loss, dehydration and a massive pleural effusion. She had sclerodactyly, generalized skin thickening and pigmentation, Raynaud's phenomenon and pulmonary fibrosis. Laboratory examination revealed leucopaenia ($<3000 \mu\text{l}$), a positive anti-double-strand DNA antibody (dsDNA; 24.5 IU/mg, normal <10), a high anti-Scl-70 antibody (106.2, normal <15) and a high anti-Sm antibody (33.3, normal <15), but an anti-centromere antibody was not found.

Investigation of the aetiology of the pleural effusion revealed that levels of anti-dsDNA and anti-Sm antibodies were higher in her pleural fluid than in her serum, whereas the pleural level of anti-Scl-70 antibody was lower. These findings suggest that the pleural effusion resulted from SLE serositis.

We then measured tumour markers (CEA, CA19-9, CA125) and pro-inflammatory cytokines. The pleural fluid levels of interleukin-6 (IL-6) and CA125 (170 pg/ml and 625 IU/ml) were markedly higher than the serum levels (12.6 pg/ml and 70 IU/ml). The levels of interleukin-8 (36.2 pg/ml) and sICAM-1 (420 pg/ml) were also higher than in the serum (17.5 pg/ml, 260 pg/ml). No obvious changes were found in levels of interleukin-1 β , TNF- α (<5 pg/ml), TGF- β 1 or vascular endothelial growth factor (84 pg/ml) in the pleural fluid. Because IL-6 and CA125 are associated with the activity of SLE rather than systemic sclerosis [4–6], the increased levels of IL-6 and CA125 in pleural fluid may be a feature of pleuritis caused by SLE in the overlap syndrome.

The measurement of pleural pro-inflammatory cytokines, CA125 and adhesion molecules may provide valuable information for the pathogenesis of overlap syndrome accompanied by pleural effusion.

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Patient and carer perception of the management of Parkinson's disease after surgery

SIR—Withdrawal of regular medication is associated with an increased risk of post-operative complications in general surgical patients [1].

Anecdotally, patients with Parkinson's disease (PD) fare poorly after peri-operative cessation of levodopa therapy [1]. Research into peri-operative complications in PD is limited. However, a retrospective cohort study showed that patients with PD are at greater risk of specific complications and have longer hospital stays than those who do not have PD [2]. In particular, there are increased rates of urinary tract infection, aspiration pneumonia, bacterial infections, post-operative delirium and hypotension. A case note review of PD patients undergoing surgical procedures suggested that post-operative confusion occurred in 60% of cases, although numbers were small [3]. We have investigated the possible association between PD post-operative complications and difficulties in administering medication.

Our research was supported by a grant from the Caithness branch of the Parkinson's Disease Society. We sent a structured postal questionnaire to all members of the society in Scotland. We sought information only from those who had had a general anaesthetic and received inpatient treatment. We received 92 replies,

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with information on 125 procedures. Sixteen subjects (13%) volunteered medication timing problems in the post-operative period and 29 (23%) complained that they had to remind the staff about restarting their medication. When we combined these two subsets, we found that 37 (30%) reported some form of medication administration problem. Forty-three (34%) complained of post-operative confusion and 43 (34%) reported deterioration in their PD after surgery. Overall, 63 (50%) complained of one or both of these complications.

Of the 16 respondents who had medication timing problems, 15 (94%) complained of confusion or worsening of PD. In contrast, only 48 (44%) of the 109 who had no medication timing problems complained of PD complications ($P < 0.001$). One hundred and thirteen respondents were able to recall if they had to remind the staff to restart their medication post-operatively. Of the 29 respondents who said they had to remind staff about this, 23 (79%) complained of post-operative confusion or worsening of PD. By contrast, only 32 (38%) of the 84 who did not complain of having to prompt staff reported PD complications ($P < 0.001$). When these two groups are combined, 31 (84%) of the 37 respondents who had either one of the medication administration problems complained of confusion or reported worsening of PD following surgery, as opposed to only 32 (36%) of the 88 who reported no medication administration problems ($P < 0.0001$).

There was no significant difference in mean age 72.3 years [95% confidence interval (CI) 70.3, 74.3] *vs* 70.0 years (95% CI 68.2, 71.8) or mean duration of PD at time of surgery 6.6 years (95% CI 5.1, 8.0) *vs* 5.2 years (95% CI 4.2, 6.1) between those that had and those that did not have medication administration problems. Medication administration problems were independently associated with confusion or worsening of PD in isolation (both P values < 0.002). Overall, the respondent was unhappy with the way their PD was managed in the peri-operative period in 39 (31%) of the 125 procedures.

Our survey suggests that medication administration problems are common in patients with PD undergoing surgery and are associated with post-operative confusion or worsening of PD. Dissatisfaction with peri-operative PD management is high. Although there is likely to be positive reporting bias by respondents with adverse experiences, there was evidence of structured criticism in the response, and of independently reported similar problems, suggesting that there are important messages for PD management after surgery.

Some of these problems may extend to hospital admissions for non-surgical problems in PD patients. Of relevance to post-surgical PD management are those patients who are unable to restart oral medication following surgery. Case reports have described the successful use of subcutaneous apomorphine and rectal domperidone post-operatively [4, 5]. A prospective study

is justified to clarify further the reasons for the high morbidity in the peri-operative period and to determine whether pathways of care would improve the management of such patients.

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A case of chronic subdural haematoma presenting as a transient ischaemic attack

SIR—A 72-year-old man presented with sudden onset of weakness of the right arm, which started to improve within a few hours of admission. The patient had accidentally bumped his head against a doorway with no overt injury 3 weeks before presentation. He had complained of mild headaches for a few days before admission. The medical history included hypertension, atrial fibrillation (for which he was on treatment including warfarin) and congestive cardiac failure.

On examination, his atrial fibrillation, hypertension and cardiac failure were under control. Power in the right arm was 3/5. There was minimal facial muscle weakness (upper motor neurone type) on the right. Sensation was intact. The biceps and triceps jerks on the right were exaggerated. Power and reflexes in the legs were normal. Plantar reflexes were flexor bilaterally. On fundoscopy there were no abnormalities. There was no carotid bruit. The weakness completely resolved within 24 h.

Full blood count, erythrocyte sedimentation rate, electrolytes and creatinine were normal. International Normalized Ratio (INR) on admission was within therapeutic range at 2.3. Electrocardiogram confirmed controlled atrial fibrillation. However, a computed tomography scan of the head showed a large chronic subdural haematoma on the left side with midline shift (Figure 1). He was transferred to a neurosurgical unit, where the haematoma was successfully evacuated. The patient made an uneventful recovery.

Transient neurologic deficit is an uncommon presentation of a subdural haematoma. In their review, Kaminski *et al.* [1] found only 32 reported cases of subdural haematoma presenting as transient ischaemic attack (TIA) by 1992. There have been a few individual case reports since then [2, 3]. Although it is an uncommon presentation, its recognition is important as routine use of antiplatelet agents can result in harm.

The common presentations of transient neurologic deficits in subdural collections include aphasia (77%), sensory symptoms (57%), headache (48%), hemiparesis (50%) and visual disturbances (3%) [1]. The mechanism of these presentations is unclear: local ischaemia resulting from mechanical pressure due to the haematoma [4], focal epileptic discharges [4], vascular displacement and ischaemia resulting from cerebral oedema [5], small recurrent haemorrhages [6] and cortical depression by mechanical stimulation secondary to a cerebral mass [7] have been suggested.



Figure 1. Computed tomography scan of the head: a large chronic subdural haematoma can be seen on the left side with midline shift.

Transient neurological deficits are usually a result of a TIA; in a few cases they may be manifestations of migraine, partial seizures, intracranial tumours, vascular malformations and giant aneurysms.

Labyrinthine disorders, multiple sclerosis and metabolic causes (such as hyponatraemia and hypoglycaemia) can also present as TIAs. Awareness of these conditions is important for accurate management. A careful history is vital. Even though in our patient the symptoms were of TIA, the history of previous trauma to the head, headaches and anticoagulation suggested the possibility of a subdural collection.

Despite the presentation of a TIA, a brain scan to exclude intracranial haemorrhage was warranted in this patient as he was on warfarin. However neurological imaging is not routine for TIAs when patients are not on anticoagulants. It is possible that cases of subdural haematoma and other conditions that present with transient deficits are being missed. We therefore suggest that there should be a policy of considering neurological imaging in all patients with transient neurological deficits presenting with an atypical history, a history of fall or head injury, recurrent episodes (with or without anticoagulation), in all patients on anticoagulation (even when the INR is within the therapeutic range) and in those with features of other systemic disorders that could account for the neurological deficit.

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Hospital-at-home and community care: are they the same?

SIR—We read with interest the article by Hyde *et al.* [1] on the impact of supporting hospital discharge in elderly patients in the form of in-home care. In a society that is growing older, organizing care for elderly people is a 'hot' issue, and the results of research may have an impact on service decisions.

The research tool of systematic literature review used by Hyde *et al.* [1] provides a useful methodology to clarify obscure points about clinical effectiveness. This technique defines the search profile used and identifies clearly the articles included or rejected for review, along with the criteria on which this choice was based. With the information thus obtained, this method makes it possible to draw a series of conclusions (with or without meta-analysis) from the results.

Hyde and co-workers' [1] study describes the effects of providing in-home support care *versus* not providing it in a programme for chronically ill patients who have been discharged from hospital after treatment of an acute illness. However, they do not differentiate between long-term in-home care and care provided through hospital-at-home programmes managed by the hospital. Although all these forms of home care are included in the Medline thesaurus under the term 'home-care services', they are very different.

Hospital-at-home programmes are managed by the hospital team. In these instances, care is provided to the patient in his or her own home, and the technical resources and staff are furnished by the hospital. This type of care is characterized by various features: it can be highly complex (fluid therapy, aerosol therapy, blood transfusions, chemotherapy, etc), intensive in time (requiring many visits in a short period of time) and usually lasts for a short time (10–20 days). It is provided to patients who, as Shepperd *et al.* [2] have defined in their review, have been hospitalized for an acute illness but are permitted to complete their recovery at home, where they may require complex procedures.

Because of these features, this type of care should be differentiated from long-term home-care services provided to patients who have been discharged from hospital. In our country, this second type of care is provided by primary-care teams. Hyde and co-workers' systematic review concentrated in this type of care. However, for the above reasons, we are not convinced of the appropriateness of including these two types of in-home care in the same analysis.

In their review of hospital-at-home care, Shepperd *et al.* [2] reject two articles, considering that rather than covering hospital-at-home programmes, they refer to long-term follow-up programmes of chronically ill patients. However, Hyde *et al.* [1] include these two articles in their review. They also include studies by Donald [3] and Martin [4] (as did Shepperd *et al.*), although these articles refer to hospital-at-home

programmes with the characteristics described above. The inclusion or exclusion of these studies changes the conclusions based on the paper's main findings. When the odds ratios (ORs) are recalculated, it is impossible to appreciate the effect of the patients staying in their homes for longer at 6–12 months, depending on whether they received in-home care or not [OR = 1.33 (0.97–1.82)].

When a patient is in a hospital-at-home programme, his or her caregivers (usually family or helpers from private organizations) require formal support. For this reason, this type of in-home care cannot be evaluated alongside other care provided after hospital discharge, where care may or may not be necessary or indispensable. When these two types of situations are mixed in an analysis, they introduce a selection bias.

We believe that the findings reported by Hyde *et al.* [1] are open to debate. What is more, we feel that sufficient information is not given about some key aspects, such as the degree of satisfaction of patients and caregivers. Perhaps these variables were not considered to be as important as other 'harder' ones, such as mortality, re-admission or remaining at home at 6–12 months. But maybe we are missing an important point here: should we not ask our elderly patients where they want to stay, what type of care they want to receive and who they want to provide it?

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Authors' reply

SIR—We welcome the correspondence from Ruiz-García and Peiro and the opportunity to clarify two issues that caused us difficulty: first, the nature of the intervention whose effectiveness we attempted to assess; and, secondly, the outcomes that should be considered in making

a judgement on whether the intervention is effective overall.

Concerning the nature of the intervention: our starting point was slightly different to others who have tried to review the research in this area. Rather than rely on standard descriptors such as 'hospital-at-home' or 'home-care services', we used a practical description of the intervention in our inclusion criteria—"actual additional support provided to patients or their carers from any source commenced within 1 week of discharge following an acute admission" [1]. This was because in the research literature the meaning of terms such as 'hospital-at-home' varies over time and from researcher to researcher.

Further, recognizing that the nature of the intervention could be subject to variability, we went to some lengths to record in detail, the precise nature of the support provided in each of the included studies (see columns 3 and 4 of Table 1 in our original paper). We believe scanning down these columns confirms that the nature of the support in all the included studies was general, rather than specialized or complex in the sense referred to by the respondents.

Reference to Table 1 also emphasizes that 'hospital-at-home' is an unreliable descriptor. The 'hospital-at-home' study by Donald *et al.* [2] does not seem, in its stated objectives and the personnel involved, to be an obvious representation of specialized medical care. The study by Martin *et al.* [3] does not use the word 'hospital-at-home'. Concerning the inclusion of these two studies, Ruiz-García and Peiro rightly draw attention to the fact that the statistical significance of the summary result, for the effect on number of subjects living at home at 6–12 months (shown in Figure 2 of the paper) is highly sensitive to their inclusion or exclusion. Although we dispute the rationale for excluding the two studies, the observation made reinforces a point we make throughout our article, that considerable caution needs to be employed in interpreting the available data.

Concerning the possibility of selection bias, confirmation that this has been avoided will only come through further close examination of whether the included studies meet our inclusion criteria or not, and—more importantly—whether relevant randomized controlled trials have been omitted. Having explicit inclusion criteria facilitates this.

With respect to the outcomes, we deny that we have been biased towards 'harder' measures. We considered all outcomes that had been measured in an unbiased manner. The reason we were unable to provide more detail on the satisfaction outcomes highlighted by the respondents was that they had not been measured in studies with the design criteria we judged needed to be met in order to ensure validity. Further, we emphasize in the abstract of our paper that, as long as we have no reliable information on the impact of supported discharge on functional status, patient satisfaction and carer satisfaction, there will continue to be uncertainty

about overall effectiveness. In other words, we were as concerned as the respondents were about the absence of this information.

Overall, the letter and our response should further reinforce that there are important uncertainties about the impact of supported discharge. We invite further feedback on whether the uncertainty is sufficient to make further research essential. We believe it is; without a better evidence base, this intuitively obvious intervention will remain vulnerable to political expediency and receive insufficient public funding to ensure that it is properly implemented for all those who might benefit.

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Vitamin D deficiency

SIR—We read with interest the review by Sahota [1], and were particularly interested in the measurement of parathyroid hormone (PTH) in patients attending elderly outpatient clinics.

We wished to establish the prevalence of increased PTH in elderly people attending clinic. We included 35 consecutive patients over 3 months. We recorded their medical problems, Barthel index, diet and number of hours of sun exposure, along with FBC, U&E, liver function tests (including γ GT) and PTH (Ciba-corning).

Four patients were aged 91–100 years, 20 were aged 81–90 years, nine were aged 71–80 years and two were aged 61–70 years. Five patients had raised PTH concentrations (Table 1). One subject showed biochemical evidence of osteomalacia. There was no correlation with Barthel index, diet or sun exposure in any of the five. The medical problems varied: they do not explain the increased PTH, but could explain restricted physical activity.

Secondary hyperparathyroidism is an early sign of vitamin D insufficiency [2, 3]. The commonest causes are poor nutrition and deprivation of sunlight with consequent decline in the synthesis of cutaneous vitamin D [4, 5]. In our study, reduced mobility and decreased renal hydroxylation could have contributed to the increased PTH concentrations. Identification of these cases has important implications for treatment. We found that

Table 1. Levels of calcium, phosphate and alkaline phosphatase in patients with raised parathyroid hormone concentrations

Patient no.	Calcium (2.2–2.7 mmol/l)	Phosphate (0.8–1.45 mmol/l)	parathyroid hormone (0.9–5.4 pmol/)	Alkaline phosphatase (100–280 U/l)
1	2.39	0.87	13.7	215
2	2.33	1.09	5.7	199
3	2.20	1.34	6.3	59
4	2.32	0.81	6.0	236
5	1.80	0.54	18.9	1339

early vitamin D deficiency could not have been detected had we not measured PTH.

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Nonconvulsive status epilepticus causing acute confusion

SIR—Pollock and Mitchell [1] reported a case of a 67-year-old woman who became rigid and anorexic and developed bizarre behaviour while on treatment with haloperidol and lofepramine. On hospital admission (after discontinuation of the above medications) she was pyrexial, rigid and unresponsive. Her muscle tone was markedly increased, but reflexes were normal. An electroencephalograph showed semi-rhythmic sharp and slow wave activity with anterior predominance, superimposed on a diffusely slow background. She was treated with intravenous diazepam and sodium valproate, and over the next few days her tone lessened and she became more responsive. Fifteen days after admission she was able to answer simple questions, but still needed help for transfers.

Table 1. Criteria for the diagnosis of neuroleptic malignant syndrome

1. Hyperthermia:
 - Oral temperature $\geq 38^{\circ}\text{C}$
2. Severe extrapyramidal effects (two or more of):
 - Lead pipe muscle rigidity
 - Trismus
 - Cogwheeling
 - Dysphagia
 - Sialorrhoea
 - Choreiform movements
 - Oculogyric crisis
 - Dyskinetic movements
 - Festinating gait
 - Opisthotonus
 - Flexor-extensor posturing
3. Autonomic dysfunction (two or more of):
 - Hypertension
 - Tachycardia
 - Tachypnoea
 - Prominent sweating
 - Incontinence

All three criteria are required for the diagnosis. If one of the three items is not specifically documented, two criteria must be clearly met plus one of the following:

- Clouded consciousness
- Leucocytosis $> 15 \times 10^9/\text{l}$
- Creatinine kinase $> 1000 \text{ U/l}$

This history is suggestive of neuroleptic malignant syndrome (NMS). Although her creatinine kinase was normal, and there is not enough information in the case report to assess all features (no mention of blood pressure, heart rate, sweating or incontinence), she still fulfils the diagnostic criteria for the syndrome (Table 1) with muscle rigidity, pyrexia, leukocytosis and clouded consciousness [2]. Non-convulsive status epilepticus has been reported in patients with NMS. In two recently reported cases [3], electroencephalographic findings (periodic bilateral spike wave discharges with frontal predominance) were similar to the case reported by Pollock and Mitchell. Furthermore, the treatment received by the patient discussed in this report (diazepam, withdrawal of neuroleptic drugs) is appropriate not only for epilepsy, but also for NMS.

Nonconvulsive status epilepticus is easily overlooked in patients with NMS, and may be a far more common

complication, or even manifestation, of NMS than currently recognized.

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Authors' reply

SIR—Roffe suggests that the patient we described with nonconvulsive status epilepticus could also have had neuroleptic malignant syndrome. Certainly there are clinical features common to both conditions. Our case had clinical and electroencephalographic evidence of nonconvulsive status epilepticus. She had only a mild pyrexia (37.5°C) and, although she was stiff with lead-pipe rigidity, there were no other extrapyramidal signs. She was incontinent, but this probably reflected her clouded consciousness rather than being evidence of autonomic dysfunction. Her creatinine kinase was normal, although this can occur in some 30% of patients with neuroleptic malignant syndrome [1]. Her leukocyte count was $<15 \times 10^9/l$.

There is considerable overlap between the clinical findings of nonconvulsive status epilepticus and neuroleptic malignant syndrome. We note with interest that the two conditions may co-exist and agree with Roffe that it would be easy to overlook nonconvulsive status epilepticus in patients with neuroleptic malignant syndrome.

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Spontaneous rupture of oesophagus (Boerhaave's syndrome) related to rivastigmine

SIR—I feel it is unreasonable to attribute or even relate 'spontaneous' rupture of the oesophagus to rivastigmine [1], as Boerhaave's syndrome can occur after vomiting

or retching due to any cause and indeed after violent coughing etc. The case described may well tell us that taking a high dose of rivastigmine may cause vomiting but to relate rivastigmine to rupture of the oesophagus is unscientific and unfortunately liable to get quoted for years to come!

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Adherence to recommendations of community-based comprehensive geriatric assessment programmes

SIR—It was interesting to read the paper by Aminzadeh [1] and the accompanying editorial by Gold and Bergman [2]. We would like to draw readers' attention to other relevant and valuable outcomes that can result from comprehensive geriatric assessment.

Understandably, the literature has focused on outcomes in terms of patients' physical function and survival, with conflicting results of studies and disappointingly low rates of adherence to recommendations. As Gold and Bergman point out, this patient population comprises individuals with multiple medical and psychosocial problems and often limited social support [2]. In addition, they note that it is the primary-care team and community professionals who must carry the responsibility for ongoing management. Aminzadeh [1] draws attention to the role of informal caregivers in influencing adherence to recommendations of comprehensive geriatric assessment.

We have found that many patients referred to a community comprehensive geriatric assessment service have difficult family relationships, resulting in high levels of stress for informal carers and high demands on primary- and community-care professionals [3]. Our study showed that such patients had poor psychological adaptation to their physical frailty. They were often referred for covert reasons, such as patient–carer conflict, psychological distress in both informal and formal carers and inappropriate service demands, in addition to overt physical deterioration [3]. Such patients often generated negative emotions in formal carers (such as general practitioners and community nurses), including frustration, despair and anger.

The process of community-based multidisciplinary assessment provided by the team in our study [3] generated a 'realistic' appraisal of the patient and their situation. Reflecting a realistic appraisal back to both

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informal and formal carers—that these were frail and difficult patients for whom little could be achieved in terms of physical functioning—provided emotional support and helped them feel more positive and comfortable in their caring role. In time this may result in more appropriate demands on health and social services.

Maybe we should be realistic ourselves about the likelihood of uptake of recommendations in this patient group. We feel that they are less likely to adhere to recommendations because their difficulties in adjustment to physical frailty are allied to coping strategies which emphasize familiarity with well-established routines and avoidance of change.

Perhaps outcome measures focused on the well-being of health and social service professionals caring for this complex and demanding patient population should be legitimate outcome measures in any future studies.

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Vertebral osteomyelitis

SIR—Goel and colleagues highlight conditions which may alert the clinician to serious spinal pathology [1]. The presence of urinary tract infection in elderly patients is a strong risk factor for vertebral osteomyelitis or discitis. Many studies have linked vertebral osteomyelitis with urinary tract infections, often following lower urinary tract instrumentation [2–4].

The frequency with which organisms reach the blood stream from the urinary tract has also been shown [4], with evidence for spread of infection via the pelvic venous plexus. The infection may be insidious in elderly patients, thus requiring a high index of suspicion [5].

Hence, the possibility of vertebral osteomyelitis or discitis must be considered in an elderly patient presenting with acute back pain during the convalescent phase of a urinary tract infection or following instrumentation of urethra and bladder.

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Management of blood pressure after acute stroke: a European perspective

SIR—We read with interest the letter from Bath and colleagues on the uncertainty of the management of blood pressure after acute stroke [1]. Despite guidelines, consensus statements and opinions on acute stroke management in Europe [2, 3] which warn against the immediate lowering of blood pressure, the extent of blood pressure control in the acute phase of stroke across Europe is unknown. Patient characteristics associated with the use of anti-hypertensive therapy after stroke are also not known.

As part of a European pilot study investigating the variation in acute physiological support after stroke, blood pressure management in the first week of stroke using four European hospital-based stroke registers (London in the UK, Dijon in France, Erlangen in Germany and Warsaw in Poland) was studied. Prospective data on consecutive admitted stroke patients during the first week were collected over 6 months. These included patient baseline characteristics, clinical status and blood pressure management. Regression analysis was used to identify the extent to which variations in anti-hypertensive therapy use between hospitals were due to variations in case-mix.

A total of 366 stroke patients were assessed. Statistically significant differences existed between hospitals in blood pressure control, most notably in the continuation of anti-hypertensive therapy after stroke (56–95%, $P < 0.001$), initiation of new anti-hypertensive therapy (9–24%, $P = 0.02$) and use of inotropic support (0–12%, $P < 0.001$). Significant differences in the use of blood pressure lowering therapy between hospitals were still apparent even after adjustment for case-mix ($P = 0.01$). Pre-stroke hypertension ($P = 0.01$), anti-hypertensive therapy pre-stroke ($P = 0.01$) and stroke subtype (partial anterior circulatory stroke, $P = 0.04$) were

all related to the use of anti-hypertensive therapy during the first week.

Variations in the use of anti-hypertensive therapy in the acute phase of stroke have been exposed across Europe after adjusting for case-mix. These variations are perhaps inevitable, given that there is a lack of randomized controlled trial evidence on the effectiveness of such interventions.

The use of anti-hypertensive therapy in the acute phase of stroke also varied according to stroke subtype, and it is unclear whether blood pressure lowering is beneficial across all clinical stroke subtypes. This is an important issue, since high rates of blood pressure lowering therapy are still being used in the first week of stroke.

The European Stroke Initiative warns against immediate blood pressure lowering because of the potential compromise of the ischaemic penumbra. However, some authorities suggest that systolic values over 220 mmHg or diastolic values over 120 mmHg may constitute indications for early treatment in some instances [4]. Given the current absence of convincing evidence [5] and the geographic inequality of blood pressure support across Europe, randomized controlled trials are to be encouraged to explore whether these acute treatments are effective.

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