toma. Other vascular complications include retroperitoneal bleeding, false aneurysms, arterial occlusion, arterial dissection, arterial laceration, arteriovenous fistula, infection, and cholesterol emboli.[4-6]

There are several risk factors for the development of a postcatheterization hematoma. These include advanced patient age (greater than 60), female sex, hypertension, low platelet count, large-bore catheters, operator inexperience, poor groin compression after catheter removal, high puncture site, abnormal vessel or graft, clinical evidence of peripheral vascular disease, and anticoagulant–thrombolytic therapy.[2,4,7] The likelihood of a vascular injury is higher after coronary angioplasty or stent placement than after angiography alone.[2,5]

The diagnosis is elusive and could mimic other diseases. Spontaneous RPHs usually do not present with a Cullen's sign or Grey-Turner's sign. Retroperitoneal blood could also dissect into the perineum or groin and cause scrotal hematomas, inguinal masses, or scrotal/inguinal pain, as observed in this case.[1] It has also been reported that retroperitoneal blood could irritate the psoas muscle and produce an iliopsoas sign such as is occasionally seen in appendicitis. Neurologic signs could be present as a result of compression of the femoral, obturator, and lateral femoral cutaneous nerves.[3] Nonspecific symptoms could be the only clue to intraabdominal pathology and recently performed procedures must be considered.

In cases in which the diagnosis of RPH is suspected, the definitive diagnosis can be made by CT scan. Ultrasound is a useful adjunct because it could demonstrate free fluid in the peritoneal cavity and provide a clue to the diagnosis.

BORIS V. LUBAVIN, MD
University of California, Irvine
Department of Emergency Medicine
Orange, CA

References

1. Johnson GA: Aortic dissection and aneurysms, in Tintinalli JE, Kelen GD, Stapczynski JS (eds): Emergency Medicine. A Comprehensive Study Guide Dallas, American College of Emergency Physicians, 2000, pp 412–414
2. Ricci MA, Trevisani GT, Pilcher DB: Vascular complications of cardiac catheterization. Am J Surg 1994;167:375-378
3. Sreeram S, Lumsden AB, Miller JS, et al: Retroperitoneal hematoma following femoral arterial catheterization: a serious and often fatal complication. Am Surg 1993;59:94-98
4. Johnson LW, Esente P, Giambartolomei A, et al: Peripheral vascular complications of coronary angioplasty by the femoral and brachial techniques. Catheter Cardiovasc Diagn 1994;31:165-172
5. Kent KC, Moscucci M, Mansour KA, et al: Retroperitoneal hematoma after cardiac catheterization: prevalence, risk factors, and optimal management. J Vasc Surg 1994;20:905-910
6. Franco CD, Goldsmith J, Veith FJ, et al: Management of arterial injuries produced by percutaneous femoral procedures. Surgery 1993;113:419-425
7. Trerotola SO, Kuhlman JE, Fishman EK: Bleeding complications of femoral catheterization: CT evaluation. Radiology 1990;174: 37-40

ZIPRASIDONE FOR SEDATION OF THE AGITATED ED PATIENT

To the Editor:—Recently, the Food and Drug Administration added a black box warning restricting the use of droperidol (Inapsine, Akorn Pharmaceuticals, Buffalo Grove, IL) citing "reports of deaths associated with QT prolongation and torsade de pointes in patients treated with doses of Inapsine above, within, and even below the approved range." This warning has resulted in significant changes for EPs in treating several common conditions encountered in ED practice. Of primary concern is the management of the acutely agitated patient.

Current recommendations from Akorn Pharmaceuticals reserve droperidol "for use in the treatment of patients who fail to show an acceptable response to other adequate treatments, . . .[and] all patients should undergo a 12-lead ECG prior to the administration of Inapsine to determine if a prolonged QT interval . . . is present." Further recommendations include "ECG monitoring should be performed prior to treatment and continued for 2-3 hours after completing treatment to monitor for arrhythmias."

Many EPs have had droperidol removed from their hospital's formulary; or, in cases in which agitation precludes the determination of the QT interval, EPs are forced to use alternative, less desirable treatments. These could include longer-acting antipsychotics, prolonging ED stays, or medications such as benzodiazepines, which carry a higher risk of respiratory depression.

A new class of antipsychotic has recently been approved for use in the acutely agitated, psychotic patient. Ziprasidone (Geodon; Pfizer Inc., New York, NY) has been shown effective in the management of acute psychotic agitation.[1-3] We have successfully used ziprasidone in the ED for the management of agitation in approximately 10 cases. Control of agitation is generally within 15 minutes of a single 20-mg intramuscular dose. This could be repeated for a total of 40 mg (total recommended daily dose) if indicated. Sedation is generally less prominent than with other antipsychotics, but treatment was effective in controlling agitation.

The primary limitation we have seen with the use of ziprasidone in the ED has been preparation for injection. Ziprasidone for injection is in the lyophilized form and must be reconstituted with sterile water. In practice, this takes approximately 3 minutes, and without preservative or bacteriostatic additives, must be prepared before each use or refrigerated for less than 1 week.

Our limited experience suggests that ziprasidone could be useful in the management of the acutely agitated ED patient. Future research could substantiate these findings and provide a new method for EPs to manage the acutely agitated ED patient.

MARC L. MARTEL, MD
Hennepin County Medical Center
Department of Emergency Medicine
Minneapolis, MN

References

1. Keck PE, Reeves KR, Harrigan EP: Ziprasidone in the short-term treatment of patients with schizoaffective disorder: results from two double-blinded, placebo-controlled, multicenter studies. J Clin Psychopharmacol 2001;21:27-35
2. Brook S, Lucey JV, Gunn KP: Intramuscular ziprasidone compared with intramuscular haloperidol in the treatment of acute psychosis. J Clin Psychiatry 2000;61:933-941
3. Daniel DG, Potkin SG, Reeves KR, Swift RH, Harrigan EP: Intramuscular ziprasidone 20 mg is effective in reducing acute agitation associated with psychosis: a double-blinded, randomized trial. Psychopharmacology 2001;155:128-134

CAN SEVERE ACUTE PAIN ESCAPE VISUAL ANALOG SCALE SCREENING IN THE ED?

To the Editor:—Pain relief is certainly one of the most important components of medical care for all patients of all times

0735-6757/04/2203-0028$30.00/0
doi:10.1016/j.ajem.2004.02.027

Supported by UPSA France.

0735-6757/04/2203-0029$30.00/0
doi:10.1016/j.ajem.2004.02.022

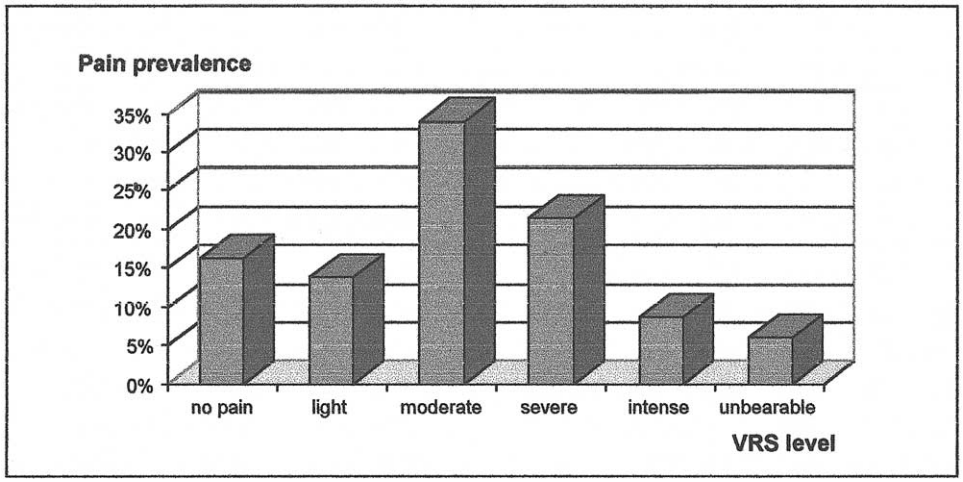

FIGURE 1. Verbal Rating Scale pain level distribution of ED patients.

throughout the world. In EDs, pain prevalence is very high; it was estimated to be over 80% in several French multicenter studies.[1,2] It is now widely admitted that pain treatment does not hinder diagnostic investigations or therapeutic procedures.[3-5] Therefore, appropriate analgesia should be a priority in EM.[6] However, pain control practices are often inadequate in ED for several reasons.[2,7,8] The very first of these reasons (at least chronologically if not in general) is the underestimation of patients' suffering. One-dimensionalscales such as the Visual Analog Scale (VAS) and Verbal Rating Scale (VRS) have been proposed for routine pain intensity evaluation in post-operative and emergency situations.[9,10] In 1994, a Canadian Association for Emergency Physicians consensus recommended VAS for initial pain and pain relief evaluation.[11] However, although VAS is the actual standard used in most ED clinical trials dealing with pain management,[10,12] it is not actually systematically used by emergency practitioners to evaluate pain intensity,[2,8,13] maybe because its pertinence to reveal severe acute pain (SAP) in ED lacks evidence. The purpose of the study was to test VAS ability to identify SAP, to establish the VAS level best corresponding to SAP, to measure its sensitivity, specificity, positive and negative predictive value (PPV and NPV) and to describe the characteristics of SAP that escape to VAS screening in the ED.

During 7 consecutive days, patients aged over 15 years presenting to the ED of any of the six hospitals of the district were enrolled in the study. Criteria for excluding patients were life-threatening distress, refusal to participate in the study, intellectual functional alteration (such as alcoholism or senile dementia), and inability to understand French.

Pain intensity at time of arrival to the ED was assessed with the VRS and VAS. Questionnaires using a six-point box VRS to collect VRS level were blindly paired to medical forms recording VAS level. VRS and VAS documents with a common anonymous number were separated at the time of the patient's arrival to the ED. VRS questionnaires were completed by patients and kept aside from the emergency practitioner's view while he filled out the medical form, including VAS level. The other data collected on these documents were patient's satisfaction concerning pain management (satisfied vs. not satisfied), VRS final level (six-point box VRS scale), pain origin (trauma vs. nontrauma), pain type (continuous vs. intermittent), and pain treatment (analgesia in ED vs. no analgesia in the ED). The anonymous numeration authorized paired analysis of blindly collected data.

SAP was defined by patient's initial VRS score = severe pain (severe, intense, or unbearable pain). The ability of the VAS to identify SAP in the ED was measured with a VAS score > 30 mm, a VAS score > 40 mm, and a VAS score > 50 mm as screening tests. MacNemar tests, Cohen's concordance, and Youden's coefficients were analyzed to find out which VAS level best corresponded to SAP definition.

Of the 2929 patients aged over 15 years presenting to the ED during the survey, 1477 were excluded: 232 for life-threatening distress, 332 for refusal to participate in the study, 297 for intel-

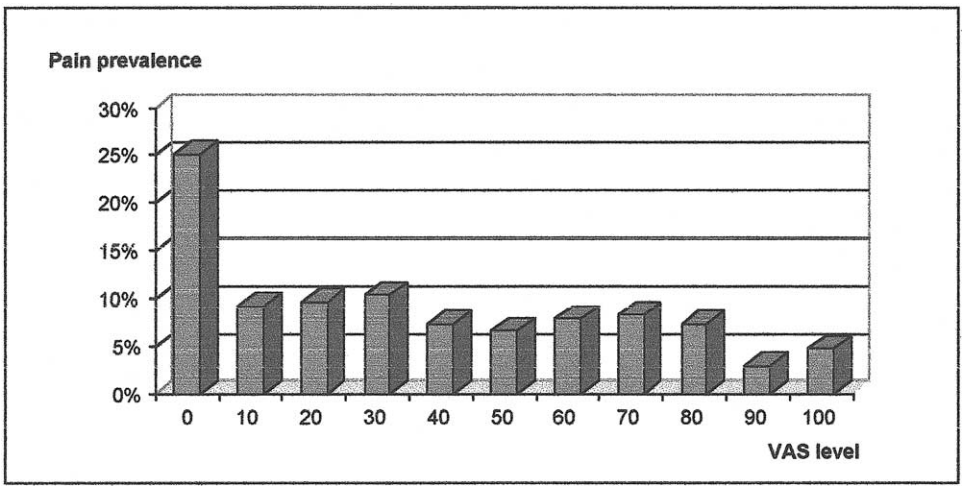

FIGURE 2. Visual Analog Scale pain level distribution of ED patients.

TABLE 1. Visual Analog Scale (VAS) Discriminant Power to Detect Severe Acute Pain in the ED

	VAS > 30 mm	VAS > 40 mm	VAS > 50 mm
MacNemar paired analysis	$P < .01$	$P > .05$	$P < .01$
Chi-squared prevalence analysis	$P < .01$	$P > .05$	$P < .01$
Cohen's concordance	0.81	0.85	0.75
Youden's coefficient	0.83	0.86	0.73
Sensitivity	0.93	0.92	0.78
Specificity	0.90	0.94	0.95
Positive predictive value	0.84	0.89	0.90
Negative predictive value	0.96	0.95	0.88

lectual alteration, and 616 for inability to understand French. A total of 1064 double-paired fulfilled forms were analyzed for the 1452 included ED patients. Mean simultaneous response rate was 72%.

Figures 1 and 2 show VRS and VAS pain-level distribution of ED patients. Pain prevalence in ED was estimated 84% with the VRS and 75% with the VAS ($P < 0.01$). SAP prevalence was estimated 36% with the VRS, 42% with the VAS > 30 mm ($P < .01$), 37% with a VAS > 40 mm ($P > .05$), and 32% with a VAS > 50 mm ($P < .01$).

Table 1 shows the results of the MacNemar test, chi-squared prevalence comparison, Cohen's concordance, and Youden's coefficients analysis as well as sensitivity, specificity, PPV and NPV for VAS testing. VAS > 40 mm appears to be the best level to define SAP in the ED ($P > .05$). VAS > 30 mm leads to overestimating SAP prevalence and VAS > 50 mm leads to underestimating SAP prevalence ($P < .01$). The characteristics of VAS > 40 mm used as a screening test to identify SAP in ED are as follows: sensitivity 0.92, specificity 0.94, PPV 0.89, and NPV 0.95.

Of 383 ED patients who declared VRS pain level = severe (SAP subgroup), VAS screening identified 351 scores > 40 mm. The occurrence of SAP escaping to VAS screening was 8% (CI_{95}, 5-11%) among SAP group and 3% (CI_{95}, 2-5%) among all ED patients. The 32 cases of SAP that escaped to VAS screening were compared with the 351 detected cases (Table 2) and appeared to be significantly different ($P < .01$): no analgesia administered during the ED stay (100%), spontaneous pain relief (75%), and intermittent type (44%).

The exclusion criteria are those of similar designs.[1,8,13] The inability to understand written French language was the principle exclusion criteria of the study (21% of ED patients). The number of excluded patients is prone to selection bias but seems inevitable and is difficult to appreciate because it does not appear in all publications.[1,8,12,14] A multicenter prospective survey requiring comparative and blindly paired data is a challenge given the constraints of ED in France. Considering that VRS and VAS documents were to be separately completed and later assembled for paired analysis, 72% response rate (1064 double-fulfilled forms of 1452 included ED patients) is a success.

VRS and VAS are both considered as one-dimensional, simple, and validated methods for pain intensity evaluation.[9,13] The only true experts in the matter are the patients themselves.[13,14] In this study, VRS scoring was performed by ED patients alone completing a multiple-choice questionnaire. VRS was a completely self-rating procedure and therefore considered as the reference for SAP definition. VAS was performed by patients like in routine practice with the help of EPs who were expected to deliver the following message: Move the cursor along the blue line to indicate the intensity of your pain. The left end represents no pain and the right end represents the most intense and unbearable imaginable pain. The participation of the ED practitioner is important in the evaluation procedure, and VAS scoring cannot be considered as a completely self-rating method.[9,15]

Naturally, VRS can only be a self-rating reference if the patient reads the pain evaluation form and uses a pen or pencil to tick the blanks, without the assistance of the ED team. That is why there are so many excluded patients (50%), and why the VRS written questionnaire cannot be recommended as a standard for pain evaluation in EM. On the other hand, the VAS procedure is easily accepted by ED patients, and pain scoring satisfies emergency practitioners. The question of VAS ability and discriminant power to identify SAP in the ED seems therefore justified and was the main purpose of this study.

The difference between pain prevalence in the ED estimated with VRS (84%) or VAS (75%) demonstrates that ED practitioners using VAS tend to ignore a significant part of a patient's suffering. The comparison of VRS and VAS pain-level distribution for ED patients (Fig. 2) shows that the underestimation of pain prevalence is the result of mild pain ignorance, as if mild pain was insufficient to activate a move of the VAS cursor.

Although VAS is widely used in pain management trials and clinical practice, the answer to the question, "What VAS level best corresponds to SAP?" is not easy. The usual frontier separating light or moderate from important or severe pain varies from VAS > 30 mm to VAS > 50 mm.[1,7,16] Therefore, the discriminant power of the VAS as a screening test to identify SAP had to be analyzed considering 30 mm, 40 mm, and 50 mm as possible border levels. VAS > 40 mm appears to be the best screening test throughout all outcome measures. MacNemar (based on discordant paired data analysis) and chi-squared test (based on prevalence comparison) both conclude that VAS > 40 mm and the patient's opinion through VRS are concordant to define SAP in the ED ($P > .05$), whereas VAS > 30 mm and VAS > 50 mm overestimate or underestimate SAP ($P < .01$). The other features of VAS screening tests (Table 1) lead to the same conclusion, and indicate that VAS > 30 mm is better than VAS > 50 mm. (We did not analyze other border levels such as 35 or 45 mm).

Therefore, VAS is efficient for SAP identification. The high sensitivity (0.92) and NPV (0.95) of VAS level > 40 mm as a screening test prove that very few cases of SAP escape to VAS identification. Moreover, cases of SAP that do escape VAS screening in the ED do not significantly affect patient's satisfaction despite the lack of analgesia, probably because of the very high frequency of spontaneous pain relief encountered in this particular subgroup (Table 2). Considering that light and momentary pains are not a priority for emergency practitioners, VAS is very pertinent in the ED.

The best border level to define SAP with VAS in ED is VAS > 40 mm. Light pain is sometimes ignored, but very few cases of SAP escape VAS screening in the ED. Furthermore, undetected pains are ephemeral and do not affect a patient's satisfaction. The high sensi-

TABLE 2. Characteristics of Severe Pain That Escape Visual Analog Scale (VAS) Screening

	VAS score > 4/10	VAS score = 4/10	*P*
No	351	32	$P < .01$
Trauma/*nontrauma*	56%/*44%*	58%/*42%*	$P > .05$
Intermittent/*continuous*	10%/*90%*	44%/*56%*	$P < .01$
Spontaneous relief/*persistent*	33%/*67%*	75%/*25%*	$P < .01$
Analgesia in ED/*no analgesia*	77%/*23%*	0%/*100%*	$P < .01$
Satisfied patients/*unsatisfied*	40%/*60%*	38%/*62%*	$P > .05$

tivity and pertinence of the sliding cursor moving along the blue line should encourage the VAS for pain level scoring in EM.

KOLIA G. MILOJEVIC, MD
J.-P. CANTINEAU, MD
R. RUIZ, MD
B. COUDERT, MD
S. BATAILLE, MD
F. BOUTOT, MD
N. SIMON, MD
Y. LAMBERT, MD
Mobile Intensive Care Units and Emergency Departments
Versailles District Hospitals
Versailles, France

References

1. Tempelhoff C, Tempelhoff G: La douleur dans les services d'accueil et d'urgence: état des lieux, étude multicentrique. Réan Urg 1993;2:328-330
2. Simon N, Alland M, Brun-Ney D, et al: Le traitement médicamenteux de la douleur de l'adulte dans un service d'accueil et d'urgence. Réan Urg 1993;2:321-327
3. Pace F, Burke TF: Intravenous morphine for early pain relief in patients with acute abdominal pain. Acad Emerg Med 1996;12: 1086-1092
4. Brasseur L, Larue F, Charpak Y: L'analgésie postopératoire en France. Etude sur l'attitude des médecins prescripteurs. La presse médicale 1992;21
5. Boureau F, Doubrère JF: Le concept de douleur. Du symptome au syndrome. Doul et Analg 1988;1:11-17
6. Cordell WH: Pain—control research opportunities and future directions. Ann Emerg Med 1996;27:474-478
7. Van der Roost D: Intervention en soins infirmiers. Face à la douleur aux urgences: action. Réan Urg 1993;2:352-356
8. Berthier F, Le Conte P, Garrec F, Potel G, Baron D: Analyse de la prise en charge de la douleur aiguë dans un service d'accueil et d'urgence. Réan Urg 1998;7:281-285
9. Boureau F, Luu M, Héricord P: Evaluation de l'intensité de la douleur au service d'accueil et des urgences, intér. Réan Urg 1993; 2:321-327
10. Hirsowski F, Boureau F: Nécessité d'évaluer la douleur en pratique quotidienne. Douleurs 2000;1:1
11. Ducharme J: Emergency pain management: a Canadian Association of Emergency Physicians consensus document. J Emerg Med 1994;12:855-866
12. Yealy DM: Prehospital pain research. Ann Emerg Med 1996; 27:471-473
13. Berthier F, Potel G, Leconte P: Comparative study of methods of measuring acute pain intensity in a ED. Am J Emerg Med 1998; 16:132-136
14. Huskisson EC: Measurement of pain. Lancet 1974;2:1127-1131
15. Boureau F, Luu M, Gay C: Les échelles d'évaluation de la symptomatologie douloureuse chronique. Med Hyg 1982;40:3797-3805
16. Ricard-Hibon A, Leroy N, Magne M, Leberre A, Chollet C, Marty J: Evaluation de la douleur aiguë en médecine préhospitalière. Ann Fr Anesth Réanim 1997;16:945-949

POSTPARTUM HEADACHE RESULTING FROM BILATERAL CHRONIC SUBDURAL HEMATOMA AFTER DURAL PUNCTURE

To the Editor:—In the ED patients diagnosed with a chronic subdural hematoma (cSDH) are often characterized by old age, alcohol abuse, or coagulation abnormalities. Besides, cSDH might rarely coincide with other not as prominent conditions.[1,2] To consider a cSDH early in patients who received a dural puncture and present progressive decline in the level of consciousness or a focal neurologic deficit could prevent serious sequelae of a disease with an otherwise good prognosis.

We report the occurrence of a cSDH in a 31-year-old, healthy nulliparous woman, who received an epidural analgesia for labor pain when delivering twins after an uneventful pregnancy. While attempting epidural catheter positioning, an unintentional dural puncture was made, diagnosed by clear cerebrospinal fluid (CSF) drainage. A second catheter was successfully placed through a 17-g Quincke needle and satisfactory pain control was obtained. The vaginal delivery of both babies had to be assisted by vacuum extraction after insufficient decent during the second stage of labor. The mother reported a bifrontally located headache, which got worse on getting up and improved in the supine position. This headache was interpreted as postdural puncture headache (PDPH) which is seen in up to 74% of obstetric patients after unintentional dural puncture.[3] It subsided within 7 days.

On day 17 after delivery, the patient reported a new headache without improvement on lying down. On day 20, she started to feel nauseated, to vomit, and was seen in the ED, where the patient was drowsy but orientated (Glasgow Coma Scale 14). Physical examination did not reveal a focal neurologic deficit. Laboratory tests did not reveal a coagulation disorder.

The computed tomography (CT) scan revealed bilateral cSDHs (Fig 1A) and diminishing of the basal cisterns indicate increased intracranial pressure (Fig 1B). Immediate surgical evacuation was achieved through burr holes on both parietal tubers. Postoperatively, the patient's condition improved rapidly but she reported an inability to name and recognize objects, whereas her visual acuity and visual field were intact. The visual agnosia resolved completely within 3 days. Regular follow- up investigations did not reveal any focal neurologic deficit.

cSDH is a known complication after head trauma in patients with predisposing factors, such as old age, alcoholism, and coagulation disorders.[1,4] cSDHs after dural puncture, spinal or epidural anesthesia are rare. The largest published series on 434 intracranial hemorrhages secondary to regional anesthesia revealed only six cases (1.4%) of cSDHs with a possible link to a primary spinal anesthesia during labor.[2] A study screening 24,000 spinal anesthesias revealed only one subsequent cSDH (4%).[4]

cSDHs form when bridging veins rupture and blood accumulates in the space between the arachnoid and the dura. Electron microscopic data on human bridging veins show thin walls of variable thickness, circumferential arrangement of collagen fibers, and a lack of outer reinforcement by arachnoid trabecules, all contributory to the subdural portion of the vein being more fragile than its subarachnoid portion.[5] This fragility might lead to rupture by traction and tearing in the instant of a head trauma. In the patient we report, the cSDH could have been caused by CSF hypotension. CSF hypotension could be a consequence of CSF outflow into the soft tissue after injury of the lumbar dura.[4,6] CSF loss might be accentuated by increased CSF pressure caused by active bearing down during the second stage of labor. In patients receiving spinal anesthesia, larger needles are used, leaving a larger fistula enabling more rapid CSF drainage.[3] CSF hypotension could have been aggravated by the vacuum extraction assisting the delivery.

The patient we present had no predisposing factors for cSDH. Still the diagnosis of the PDPH had to be doubted because the headache lasted more than 2 weeks. A cranial CT is justified if a suspected PDPH is resistant against conservative therapy, increasing in severity, or recurring after a pain-free interval. Vomiting, somnolence, hemiparesis, hemihypesthesia, aphasia, or signs of personality changes might be present but need not accompany the clinical picture. In bilateral cSDH, unilateral focal deficits could be difficult to recognize. The symptoms could subside after surgical decompression, but permanent neurologic deficits have been reported in old patients and when the hematoma was evacuated only after a long period of time.[1]

0735-6757/04/2203-0030$30.00/0
doi:10.1016/j.ajem.2004.02.032