

Occult fracture of the L1 vertebra after ejection from an aircraft

Sir,

Emergency Medical Services sometimes face unusual cases, such as that of a military pilot forced into an emergency ejection during the flight. This is a novel situation in the ED; on the one hand, it is specific to Aerospace Medicine and on the other an unusual type of accident.

A 31 year-old man was attended in the ED after the aeroplane accident. He was a fighter pilot who had been ejected from a military plane while flying at an altitude of approximately 700 meters at a speed of 760 km/h. The patient descended by parachute and was brought to the ED with multiple injuries. He reported pain mainly in the head, thoracolumbar region and right leg. Physical examination showed no apparent lesions in the territories described, but severe pain especially in thoracolumbar region. Neurological examination was normal and Glasgow score was 15 throughout his stay in the ED. Plain radiography of the head, neck, chest, thoracolumbar spine, pelvis and right knee revealed no bone harm. The patient was put under observation and given analgesic and anti-inflammatory treatment. Given the persistence of the symptoms, computed tomography (CT) scan of the thoracolumbar spine was performed: it showed good spinal alignment but degenerative changes in the intervertebral spaces from the vertebrae D6 -D7 to D10-D11 and the presence of osteophytes, with loss of height of the vertebral bodies (especially D8, D9 and D10) suggestive of compression fracture, with anterior wedging of L1 (Figure 2). The patient was discharged despite persistent thoracolumbar pain. Analgesics and anti-inflammatory drugs were prescribed and he was referred to his regular physician for follow up. Seven days later, given the persistence of symptoms, his physician ordered magnetic resonance imaging (MRI) which confirmed L1 fracture (Figure 3).

When pilot ejection occurs, any spinal injuries are mainly caused by the force of the ejection; in our patient's aircraft (a Mirage-F1) the speed of ejection is 24 m/sec and the acceleration is 16 G/sec, which can cause compression of the whole spine. The region of the spine most

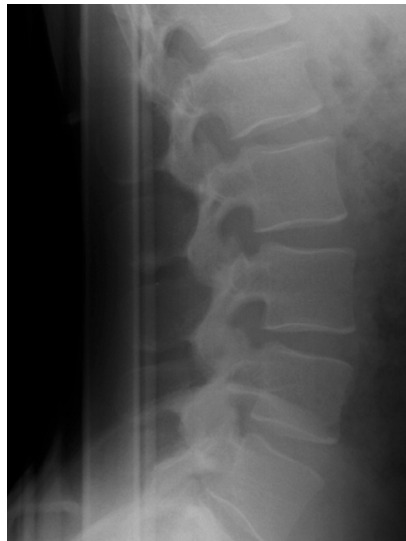


Figure 1. Lumbar spine X-ray, interpreted as indicating no significant lesions.

frequently affected is between D10 and L2¹. The proportion of vertebral fractures in these circumstances is high, varying between 14.8% and 31.8%, and depends on the type of aircraft². The annual incidence of ejection-induced vertebral fractures varies between 33% and 60%, with a mean 47.5%^{3,4}.

Certain studies have compared the sensitivity of conventional radiology versus helical CT to identify thoracolumbar fractures. One found a thoracic spine sensitivity of 62% for plain X-ray and 97% for CT, while for lumbar spine the sensitivities were 86% versus 95%, respectively. The authors recommend thoraco-abdominal CT to rule out lumbar fractures in serious injuries due to its greater sensitivity and speed⁵. According to the authors of another series, the accuracy of CT for the diagnosis of lumbar spinal fractures was 99% versus 87% for plain X-ray⁶. Further complicating matters, we would point out that the absence of symptoms does not exclude lumbar spine injury⁷. Frankel et al. found that only 60% of patients with such fractures actually had symptoms⁸.

In summary, very careful initial assessment of high energy-induced thoracolumbar trauma is required,



Figure 2. Lumbar spine CT scan, suggestive of L1 wedging above (arrow).

and injury may be present despite a low level of pain. This possibility must be considered in cases of fighter pilot ejection. CT scan is recommended in such cases, with or without severe symptoms, and close monitoring during follow-up with further imaging tests if necessary.

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Figure 3. Lumbar spine MRI showing the L1 fracture (arrow).

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Blunt splenic injury: analysis of management

Sir,

In blunt abdominal trauma, the organ most often affected is the spleen¹. Although still controversial, selective conservative treatment is increasingly used.

We analyzed factors possibly associated with treatment choices for blunt splenic trauma in recent years (2005-2008), with a total of 31 patients. Not unexpectedly, the cause of such injury was mainly traffic accidents (58%). No deaths occurred. Of the 31 patients, 20 (64.5%) received initial conservative treatment, which was effective in 15 cases (75%). This represented a significant increase over the 42% reported in a similar study covering the period 1994-1999², reflecting the current trend towards conservative management of this condition.

Analysis of the variables showed that age, sex, history or other associated injuries bore no significant relationship with the initial choice of treatment or evolution. In contrast, clinical data and abdominal examination findings were important factors in the initial management of the patient^{1,4}, as were the presence of hypotension, low CBC and signs of peritonitis on admission ($p < 0.05$), with greater likelihood of emergency surgery. The degree of splenic injury was also statistically significant^{3,7}. Most injuries classified as grades I-II2 were effectively managed with conservative treatment. Splenic failure increased with the degree of in-

jury; those classified as grade III or higher, along with the need for blood transfusion, were predictors of failure ($p < 0.05$).

Finally, as expected, the rate of complications was significantly higher in operated patients (63.7% vs 13.3%)⁵, and this is one of the reasons for the preference for conservative treatment. Only one of the spleens treated conservatively presented a complication directly related to trauma: splenic pseudoaneurysm occurred one week after the trauma event and required embolization.

Although complications may arise with conservative treatment, they are infrequent and, with adequate observation, can be detected and dealt with effectively.

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Cerebellar effects after intake of morel mushrooms (*Morchella* species)

Sir,

In northern Spain there is a long tradition of mushroom picking and

eating; mushrooms are highly prized gourmet items. Every year, numerous cases of mushroom poisoning are attended at our hospitals; most are minor or trivial self-limiting gastrointestinal processes. Occasionally we treat patients with more serious symptoms and even lethal effects of mushroom consumption¹. An unusual type of poisoning is that caused by consuming mushrooms of the genus *Morchella* spp., an ascomycete fungus commonly known as "morel", considered edible, with two main species: *Morchella conica* and *Morchella esculenta*. They grow in pine, beech and ash forests and appear on the edges of streams. We here describe four cases of *Morchella* spp poisoning treated at the emergency department (ED) of our hospital.

Case 1: A 45 year-old woman. Her husband brought home mushrooms of the genus *Morchella* collected from the edge of a stream. The next day our patient cooked and ate some of them, but her husband did not, and she noted that some appeared to be undercooked. The next day she experienced dizziness, generalized tremors and instability, and difficulty moving or even standing up. At 13:00 her husband found her on the floor. He brought her to our ED where she presented nausea, vomiting, a tendency to close her eyes, bilateral horizontal nystagmus, dizziness, ataxic gait and difficulty standing. She also presented severe tremor of all four limbs, but no hallucinations. The patient was admitted to our observation ward and symptomatic treatment was initiated. 24 hours later the patient was asymptomatic and discharged home.

Case 2: A 57 year-old woman. She reported having cooked morels collected 3 days before for about 20 minutes. She ate them despite remarking that they were possibly undercooked. She experienced dizziness, dysarthria, unsteadiness, uncoordinated gait and generalized tremor, especially in the legs and hands. Physical examination showed horizontal nystagmus and Romberg's sign with a tendency to fall backwards. The patient reported no hallucinations. She was admitted to our observation ward and received symptomatic treatment for vertigo. At 12 hours the symptoms had disappeared and the patient was discharged home.

Case 3: A 60 year-old man, the husband of Case 2. He ate the same cooked mushrooms with his wife. He too presented nausea, dizziness, instability and tremor. Physical examination only showed mild tremor of the hands in repose. He reported no hallucinations. He was admitted for observation where he received symptomatic treatment. At 12 hours of

symptom onset, the patient was asymptomatic and he was discharged home.

Case 4: A 32 year old woman, the daughter of Cases 2 and 3. She experienced nausea, dizziness and instability. Physical examination revealed horizontal nystagmus and Romberg's sign lateralized to the left. The patient was admitted to observation with symptomatic treatment. At 12 hours, she was asymptomatic and was discharged home. Her husband also ate a little of the mushroom dish, but remained asymptomatic. The woman had breastfed her baby three times that night but the infant did not present any symptoms.

Morchella sp. contains a thermosensitive toxin (hemolysin) that induces hemolysis *in vitro*, but there are no published reports of hemolysis *in vivo*². These hemolysins have traditionally been considered the cause of morel poisoning³, although there are case reports of morel poisoning that do not mention hemolysins^{4,5}. This toxin is destroyed by the cooking process and by desiccation; fresh morel consumption is therefore to be avoided⁶. None of our patients had hematuria, probably due to hemolysin destruction during cooking time, in all cases at least 20 minutes.

In view of these cases and others described by other authors, it can be said that the consumption of fresh mushrooms of the genus *Morchella*, especially the species *M. esculenta*, can lead to acute cerebellar syndrome which appears about 12 hours after ingestion, with variable symptom severity, benign evolution and spontaneous recovery 12-24 hours later without sequelae.

This picture does not seem to be related to the consumption of undercooked mushrooms and therefore with heat-labile toxins. In the literature we found no cases of poisoning after the consumption of dried morels. In contrast, it does appear to be directly related with the amount ingested⁷. We therefore recommend thorough drying, or cooking of these mushrooms during at least 20 minutes before consumption, and moderate amounts. Spain has detailed legislation on the correct handling and sale of mycological products, which specifically prohibits the sale of fresh *Morchella* spp.

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Late recurrence of a psoas abscess due to methicillin-resistant *Staphylococcus aureus*

Sir,

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a frequent nosocomial pathogen¹. In recent years we have seen community-ac-

quired infections due to this microorganism². We here describe a case of psoas abscess due to MRSA with an uncertain pathogenic mechanism.

The patient was a 41 year-old Colombian man with type 2 diabetes mellitus who had been living in Spain for 6 months. In 2002 he was diagnosed with right renal adenocarcinoma for which he underwent nephrectomy without adjuvant treatment. In 2003 he underwent surgery for a retroperitoneal abscess, from which *S. aureus* was isolated, since which time he reported good health. He consulted our emergency department for fever and back pain during 7 days. He reported no trauma or any other associated symptoms. Physical examination showed a temperature of 38.3°C, pain in the right upper quadrant and positive psoas maneuver, but no lumbar pain on percussion. Lab tests showed CRP 11.4 mg/dl and leukocytes 13,460/mm³ (73% neutrophils, 18% lymphocytes and 8% monocytes). Abdominal CT scan showed a low attenuation collection of fluid with 8 x 5cm ring enhancement located on the right psoas (Figure 1). Empirical antibiotic treatment was administered with ceftriaxone and metronidazole. On day 2 of admission the patient underwent ultrasound-guided abscess puncture. MRSA was isolated and treatment was changed to vancomycin. The strain showed no growth deficit and normal formed colonies. By electrophoresis it was typified as a non-Panton-Valentine (pvl) toxin producing strain, different to Spanish nosocomial strains. Blood and urine cultures were negative. He was discharged after 14 days of parenteral treatment and received oral linezolid during two weeks. At

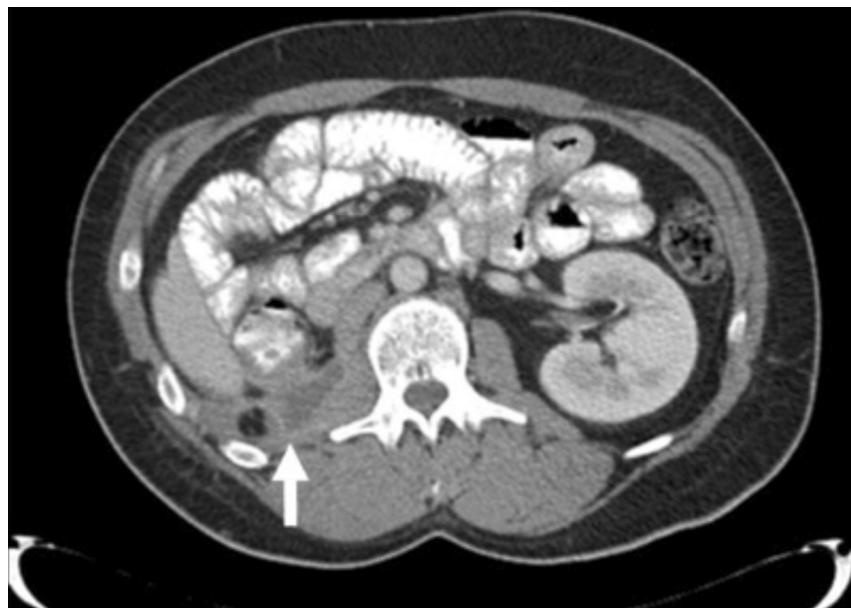


Figure 1. Abdominal CT axial slice showing an irregular collection of fluid in the right retroperitoneum, with characteristic ring enhancement (arrow).

a follow-up visit, the patient was asymptomatic.

In the USA, community MRSA is the most common germ found in skin and soft tissue infections³. For diagnosis, the Centers for Disease Control (CDC) criteria are used⁴. Most strains carry the Staphylococcal Cassette Chromosome *mec* (SCC*mec*) type IV or V, and the *pvl* toxin. However, an Irish study indicates that the presence of *pvl* or IV SCC*mec* expression are poor markers for defining the community origin of a strain⁵. The *psaos* is an infrequent location for soft tissue infection, with occasional reports of community MRSA as the causal agent⁶. CT scan is the test of choice for diagnosis. Antibiotics and drainage, percutaneous or surgical, are the mainstays of treatment. Antibiotics should be maintained for a minimum of four weeks, and can be extended depending on clinical response.

Our patient did not present any of the usual predisposing conditions for nosocomial MRSA infection. His last intervention had occurred over five years before. The resistance profile and genetic typing of the strain did not match those of the nosocomial strains that are common in Spain. These facts, together with the epidemiological history, mean that the most probable pathogenic mechanism was an exceptionally late relapse of infection contracted in his country of origin. With increased human immigration, we must be aware of changing trends in patterns of infection, as they may be relevant in some processes.

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Attempted suicide by ingestion of potassium permanganate in solution

Sir,

Potassium permanganate is a purple crystalline substance, available in the form of tablets, crystals, diluted solutions and powder. It is used as an antimicrobial, antiseptic, and topical antifungal deodorant^{1,2}. In the past it was used illegally as an abortifacient^{3,4}. We report a case of attempted suicide by liquid ingestion of this substance.

An 85 year-old man was attended at our emergency department within 4 hours of drinking a concentrated solution of potassium permanganate (50 g in 30 ml of water) with suicidal intent. He presented nausea, salivation, dysphagia, foreign body sensation in the pharynx, and epigastric pain. Vital constants were normal, he was conscious, dysphonic, with blackened swollen lips; the tongue was edematous and exhibited a black coating that extended to the oropharynx, hindering examination (Figure 1). Lab tests showed glycemia 140 mg/dl, neutrophils 12,300/mm³, lactate 35 mg/dl, ESR 44 mg/dl, and creatinine kinase 486 U/l. Chest x-ray and ECG were normal.

He received general support measures with antiemetic and gastroprotective treatment, analgesics and intravenous corticosteroids. Endoscopy was performed; in the upper digestive tract we observed blackish residue firmly attached to the mucosa but susceptible to washing to reveal normal mucosa. After nine days, the patient was admitted to a ward; endoscopy was repeated and caustic injury to the pharynx and the esophagus was observed, which a third endoscopy showed had disappeared after a fortnight. During hospitalization, general therapeutic measures were maintained with parenteral nutrition for fifteen days. Additional tests were normal and the patient was discharged one month after being hospitalized.

Potassium permanganate is a strong oxidizing agent: on contact, mucous membranes react forming water, manganese dioxide, potassium hydroxide and oxygen^{1,2}. The lethal oral dose is 143 mg/kg⁵ (10 g



Figure 1. Remains of potassium permanganate on the tongue and around the mouth.

in adults)^{2-4,6}. After intake of 1% solutions, purple-black lesions appear on the lips and mouth along with epigastralgia^{2,5}. After intake of 5% solutions, stomach cramps may occur with vomiting and diarrhea. With more concentrated solutions, edema of the lips, oropharynx and larynx is observed, and laryngospasm and bronchospasm, accompanied by necrosis of the gastroesophageal mucosa⁵. Systemic effects do not typically occur due to poor absorption^{3,4}. Tachycardia has been recorded, as have severe dyspnea and respiratory distress, hypotension and shock, metabolic acidosis, hepatorenal failure, coagulopathy with hemolysis, methemoglobinemia and pancreatitis. Deaths result from upper airway obstruction or circulatory collapse¹⁻⁶.

Lab tests should include serum electrolytes, kidney, pancreas and liver function, and complete blood count. If breathing is compromised, ABG including methemoglobin should be requested^{1,2,5}. Potassium permanganate is radiopaque and can be seen on lung and abdominal X-ray film^{1,2}. Endoscopy is useful to assess severity and prognosis^{1,2,5}. It should be performed within the first 12 to 48 hours to decrease the risk of perforation. In severe cases, follow up endoscopy allows assessment of stenosis (up to 20% of cases)¹. Treatment is largely supportive, and airway control is the main priority^{1,3}. The following are not recommended: emesis induction, neutralization with acidic agents, gastric lavage or use of activated carbon^{1,2}. The use of

corticosteroids and antibiotics, although controversial, may help reduce edema and inflammatory response, and reduce the risk of infection¹⁻³.

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Syndrome of inappropriate antidiuretic hormone secretion

Sir,

Levetiracetam is a derivative of pyrrolidone (S - enantiomer of α -ethyl -2- oxo -1- pyrrolidine acetamide), chemically related to other antiepileptic drugs (AEDs). Its mechanism of action is unclear but it seems to differ from those of existing AEDs.

Levetiracetam is excreted by glomerular filtration with subsequent tubular reabsorption. The primary metabolite (non-active) is also excreted by active tubular secretion in addition to glomerular filtration. Levetiracetam elimination is correlated with creatinine clearance. In elderly patients, its half-life is increased by about 40% (10 to 11 hours), due to decreased renal function in this population, so adverse effects could be increased. The most frequent adverse drug reactions are drowsiness and asthenia which may occur in up to 10% of patients. The development of hyponatremia is infrequent but se-

rious, with only 4 cases previously reported²⁻⁵.

A 93 year-old woman was attended at our center for disorientation and urinary incontinence during 4 days. Medical history included hypertension treated with amlodipine. One year before, following a single isolated epileptic seizure, she was diagnosed by computed tomography (CT) with sickle meningioma. A month before she suffered two generalized tonic clonic seizures and a new CT scan showed no progression of the meningioma: she initiated treatment with oral levetiracetam (1 g per day). In total, the patient had received anticonvulsant treatment during 25 days. The reason for admission was the appearance of progressive lethargy during the last 4 days. On arrival the patient was afebrile and hemodynamically stable. Physical examination was unremarkable. Lab tests showed plasma sodium 118 mmol/L (135-145 mmol/L), plasma osmolarity 230 mOsm/kg (280-295 mOsm/kg) and urinary osmolarity 839 mOsm/kg. Basal TSH and cortisol were normal. With the diagnosis of IADHSS, levetiracetam was withdrawn and fluid was restricted to 1,000 cc per day resulting in normalized serum sodium within the first 48 h. The Naranjo scale⁶ on adverse drug events was applied, and hyponatremia related with levetiracetam treatment was considered probable; this information was transmitted to the official body responsible for monitoring adverse drug reactions, the Servei Farmacovigilancia de Catalunya.

Several AEDs have been associated with the appearance of hyponatremia, but the mechanism by which IADHSS causes it remains unclear. Two possible mechanisms have been postulated: first, increased pituitary ADH secretion and second, increased renal tubule sensitivity to ADH⁷. In our case there was a relationship between the introduction of levetiracetam and symptom development due to hyponatremia. Given the trend towards increased prescription of levetiracetam, it is likely that more cases of IADHSS will arise in the future.

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C1 vertebral fracture in a norseback riding accident

Sir,

The incidence of horse-riding trauma in our country is minimal compared with that of other more popular sports, but horse-riding is considered to confer higher risk than motorcycling, football or skiing¹.

A 39 year-old man with unremarkable medical history and no underlying disease consulted the emergency department room of our hospital for severe neck pain after a fall in a horse-riding accident. He reported total amnesia of the event, which was the only neurological disorder observed. Physical examination revealed significant neck pain at the base of the skull, with midline pain, so a Minerva collar was placed on the neck. Applying the NEXUS criteria (National Emergency X-Radiography Utilization Study² presence of cervical midline pain), the patient underwent cervical, thoracic and rib cage X-rays which proved inconclusive or inconsistent with the symptoms described. Computed tomography (CT) scan of the skull and cervical spine showed a fracture of the right anterior arch and left posterior arch of the C1 vertebra, and possible hematoma associated with that lesion partially obliterating the subarachnoid space on the left side (Figure 1).

There are few studies in this field of accidents, mostly performed in North America and Australia, and predominantly involving women riders under the age of 30 years (although the incidence for both sexes is similar in riders over that age). The chest, head, neck and the upper limbs are the regions most commonly affected^{3,4}.

In the studies reviewed, the percentage of accidents requiring health care varies between 77 and 100%, depending on work/recreational context, and 6-10% required hospitalization⁵. A European study carried out in the Netherlands shows that the

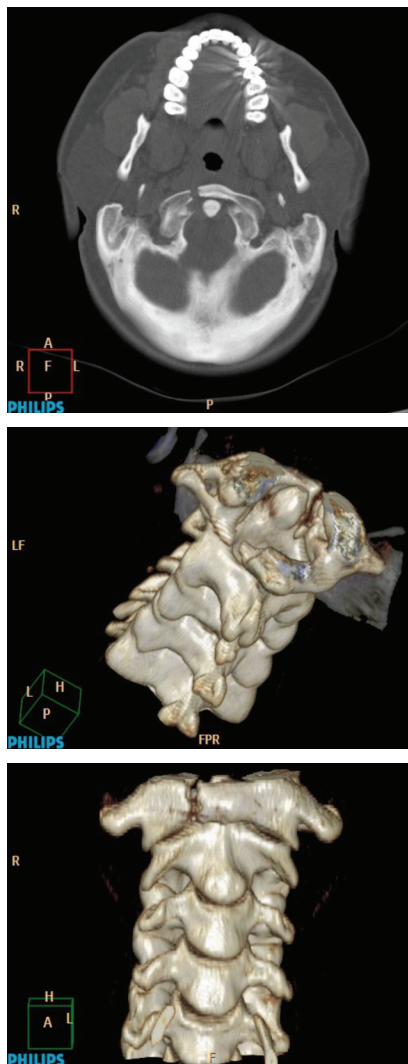


Figure 1. CT scan (upper image: axial slice, center and lower images: three-dimensional reconstruction) showing fractures of the right anterior arch and left posterior arch of the C1 vertebra.

most common level of spinal cord involvement, with 78% of fractures in a sample of 32 patients during 13 years, was the thoracolumbar junction (D12-L1) and only two cervical fractures at C5 and C6⁶. In Spain, Fontan Muñiz et al. conducted a retrospective study of the incidence of horse-riding accidents in pediatric patients. The study results coincide with respect to the most common type of injury, head trauma, and reflects the low level of preventive/protective measures such as the use of a helmet⁷.

The prevalence of riding accidents is clearly lower than that of other sports played in Spain, but the importance and severity of injuries sustained leads to high morbidity

and potential mortality with consequent socio-medical impact.

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Fulminant necrotizing fasciitis after a lancet finger prick to test for blood sugar

Sir,

Soft tissue necrotizing fasciitis (STNI) constitutes a heterogeneous group of infections affecting subcutaneous cellular tissue, fascia and muscle, in which patient survival depends largely on early diagnosis and aggressive surgical treatment.

A 72 year-old woman attended the ED with a swollen right hand after digital

glucose lancet puncture 8 days before. Medical history included hypertension, chronic B-cell lymphocytic leukemia (stage B) and high blood sugar controlled by diet. Physical examination showed erythema and swelling of the right arm and hand. The patient was afebrile and hemodynamically stable. Lab tests showed anemia, leukopenia, lymphocytosis, platelet deficiency, hyperglycemia, elevated urea and creatinine and coagulation alterations. A few hours later the patient began to show progressive dyspnea (O₂ sat 88%), oliguria and hemodynamic instability, along with right arm blistering and skin necrosis (Figure 1), for which she was admitted to the intensive care unit (ICU) where she received oro-tracheal intubation, transfusion of RBC, platelets and plasma, as well as empirical intravenous broad-spectrum antibiotic and perfusion pump vasoactive drugs. With suspected necrotizing fasciitis, she was treated in the operating room with decompression fasciotomy, washing with H₂O₂, and drainage. Eighteen hours after arrival at the hospital, the patient died. Skin lesion culture was positive for *Pseudomonas aeruginosa* and *Enterococcus faecalis*.

General interest in STNI has revived in recent years, due to increasing cases of necrotizing fasciitis associated with high mortality rates in developed countries, such as those that appeared in 1994 in Gloucester (England)¹. Despite surgical treatment, mortality is 20 to 70%².

There are two types of necrotizing fasciitis³⁻⁷: type I or polymicrobial, with a subacute course, frequently of abdominal and perineal localization (Fournier gangrene), produced by aerobic and anaerobic bacteria, and *Streptococcus* not belonging to group A; and type II or monomicrobial, where serious acute infection includes that by Group A *Streptococcus pyogenes*, most frequently located on the extremities. The gateway of the pathogen is very diverse⁸⁻¹⁰ and in 13-31% of the cases there is no clear source of infection². In the majority of cases there is some underlying dis-



Figure 1. Edema, blistering and ecchymosis of the right hand and arm.

ease^{6,7}, although not always². The most common clinical symptom is disproportionately intense pain with slight local swelling, fever and signs of systemic toxicity. In more advanced stages there may be lesions, color change and even skin crepitation. Systematic diagnostic tests are required^{4,6,7}. Radiological imaging tests (x-ray, computed tomography, MRI) help establish the diagnosis, but on initial suspicion of STNI, the recommendations include early surgical intervention, empirical wide-spectrum antibiotics and metabolic support.

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Necrotizing mediastinitis due to retropharyngeal abscess

Sir,

Mediastinitis is a serious infection of connective tissue and organs of

the interpleural space. Although rare, it is often fatal (in up to 50% of cases)¹. It is usually caused by esophageal perforation or as a complication of thoracic surgery. However, there are a few cases of mediastinitis due to infection of the teeth, cervical infections or cervical trauma, with extension to the mediastinum, producing the so-called descending necrotizing mediastinitis (DNM)^{2,3}. Mediastinitis presents with sepsis and leads to death in the vast majority of cases. We present a case of DNM originating from a retropharyngeal abscess, following upper respiratory tract infection. The patient was referred to the ED with a suspected diagnosis of thyroiditis.

A 60 year-old man with a history of type 2 diabetes mellitus treated with oral anti-diabetics was referred to our ED with suspected thyroiditis based on increased size of both thyroid lobes. He had received amoxicillin-clavulanic acid as antibiotic treatment the previous day. The patient was afebrile, and reported pain on swallowing pain during several days. Cervical palpation caused no pain, despite considerable thyroid lobe enlargement. Lab tests showed hyperglycemia, leukocytosis 20.100/ μ l with 89% neutrophilia and PCR 20 mg/dl. Plain cervical x-ray showed air density in the retropharyngeal space, leading to cervical-thoracic computed tomography (CT) scan showing the extension of a retropharyngeal abscess into the mediastinal, right paratracheal and precardinal spaces. The patient was referred to the department of thoracic surgery for surgical treatment, resulting in complete resolution.

The term DNM was coined by Estera et al.⁴ who established four diagnostic criteria: (1) clinical manifestation of severe infection; (2) characteristic radiological findings; (3) documentation of DNM during surgery or at postmortem; and (4) establishment of the relationship between DNM and oropharyngeal infection. Although DNM is a rare disease in our setting, it is associated with high morbidity and mortality⁴. Infection originating in the oropharynx spreads to the mediastinum via the cervical muscle fascias, favored by the force of gravity, the negative pressure in the thorax and ventilatory mechanics⁵. It is usually caused by aerobic and anaerobic flora⁶, reflecting oral cavity germs.

One of the most interesting aspects of the case is the form of presentation, simulating thyroiditis, since

the patient reported cervical enlargement along with odynophagia as the only symptoms, although it was later observed that the neck was increased in size due to the retropharyngeal abscess, laterally displacing both thyroid lobes. The main causes of mortality are diagnostic delay or improper drainage; hence the importance of CT scan at the slightest suspicion of DNM. Broad-spectrum antibiotic therapy and aggressive surgical drainage decrease the high mortality of this picture⁷.

In short, descending necrotizing mediastinitis should be suspected in patients with severe general condition unexplained by simple tooth infection or pharyngeal involvement. As in our case, CT scan is most useful for early diagnosis of a cervical infectious processes, as well as its spread to the mediastinal cavity, allowing early treatment that diminishes the high mortality rate associated with this disease^{8,9}.

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Thyroid gland hematoma after a traffic accident

Sir,

Hematoma of the thyroid gland is a rare condition that usually occurs after blunt trauma to the anterior part of the neck, a region that contains a large number of vital structures. Hence the importance of reaching a correct diagnosis. It can go unnoticed unless there is a high index of suspicion, especially in multiple trauma patients with other more obvious visible injuries.

A 72 year-old man visited the ED hours after a traffic accident for neck pain. Vital signs were normal and he was breathing normally. Physical examination showed a mass of about 5-6 cm in size in the left front part of the neck. Cervical x-ray showed displacement of the trachea to the right, suggesting soft tissue hematoma. Cervical ultrasonography showed a hematoma dependent on the left thyroid lobe, and this was later confirmed by computed tomography (CT), which at the same time ruled out active bleeding or the involvement of neighboring structures (Figure 1). After consulting with the otolaryngologist, conservative treatment was given. During the following month there was complete resolution of the hematoma, without complications.

Hematoma of the thyroid gland is produced by blunt trauma to the anterior cervical region, usually after traffic accidents in which the driver or passenger is knocked against the steering wheel or dashboard, or by whiplash, intense trauma to the back of the head or even by Valsalva maneuvers¹. Although in some cases a healthy thyroid gland is involved², hematoma normally occurs in thy-

roids with goiter, due to the absence of a true capsule and the presence of rich vascularization. The onset of symptoms varies from 60 minutes to 24 hours after the event and consists of a paratracheal or pretracheal cervical mass, dysphonia, difficulty swallowing, ecchymosis and edema that may compromise the airway. Ultrasound is used to establish a diagnosis and monitor the progression of the hematoma. CT scan is useful to determine the extent of the injury, the integrity of neighboring structures and the patency of the airway. Optic fiber bronchoscopy can be reserved to assess the existence of tracheal injury, visualize the vocal cords and assess laryngeal edema. Angiography is used on suspicion of a large vessel lesion or to rule out active bleeding. With respect to treatment, there is no clear consensus. It was initially treated surgically after the diagnosis, but in recent cases conservative treatment has been the preferred option, and surgical treatment has been reserved for patients with respiratory compromise or deteriorating clinical condition³.

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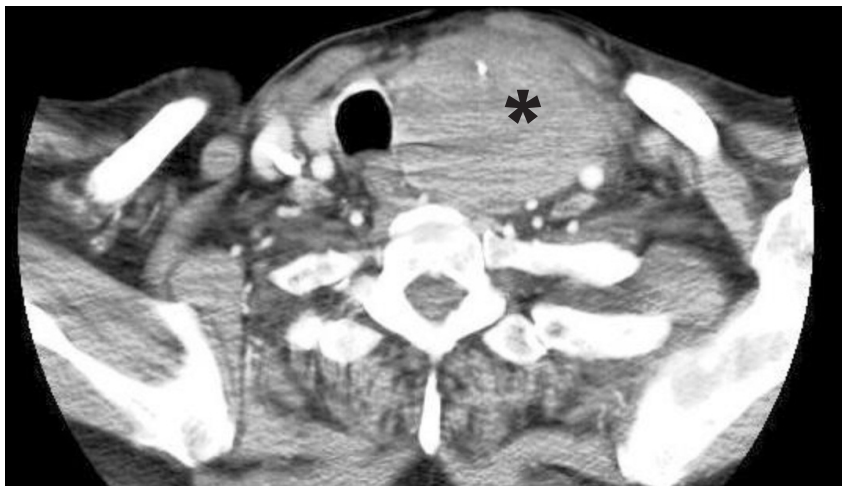


Figure 1. CT scan of the neck showing left thyroid lobule hematoma (asterisk).

Abdominal bruit and pain in a young patient

Sir,

In 1963 Harjola¹ and in 1965 Dunbar et al² discovered a previously unknown disorder characterized by the triad of postprandial abdominal pain, weight loss and occasionally abdominal murmur, which was later called celiac trunk syndrome or median arcuate ligament syndrome (MALS) or Dunbar syndrome. MALS results from compression of the celiac trunk by the arcuate ligament, a fibrous band that unites the two diaphragmatic crura, and defined as abdominal pain due to compression of the celiac artery by the median arcuate ligament fibers³.

A 32 year-old man attended the ED for brief vasovagal syncope during a febrile episode, epigastric abdominal pain after eating and general malaise. He had been diagnosed with bicuspid aortic valve and suffered recurrent abdominal pain described as repeated nephritic colic. Cardiac auscultation showed an II/IV systolic murmur and an epigastric murmur that increased on exhalation. Lab tests were normal, the electrocardiogram showed sinus rhythm and a normal PR interval, and incomplete right bundle branch block (IRBBB). Echocardiogram showed normal heart function, a bicuspid aortic valve with raphe and slight regurgitation, and non-dilated aortic root (31 mm). On finding abdominal murmur and a bicuspid aorta, thoracoabdominal CT angiography was performed (Figure 1) and this allowed the diagnosis of MALS.

Of healthy patients, 13-50% may present the angiographic characteristic of celiac trunk compression to some degree, especially during exhalation, since on inspiration the celiac trunk assumes a more caudal orientation with respect to the arcuate ligament, because the lungs are expanded, but the arcuate ligament remains relatively fixed in the aortic hiatus. It typically affects young women, aged 20-40 years, reporting epigastric pain, usually postprandial, vague and related to meals, occasionally associated with loss of weight, diarrhea, nausea, vomiting and even intestinal malabsorption.

The diagnosis is made by conventional arteriography⁵, but the development of multi-detector CT equipment with 3D software⁶ has allowed us to simplify the diagnostic procedure, because it can reveal a loop or "hook", located in the proxi-

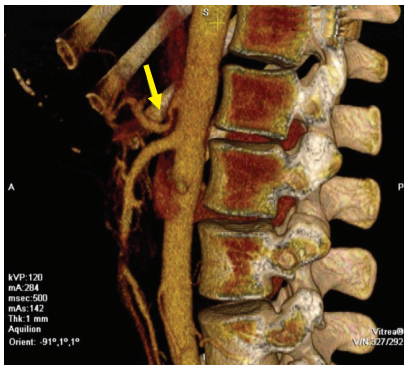


Figure 1. 3D thoraco-abdominal CT angiography showing compression of the celiac trunk origin by the arcuate ligament (arrow) causing stenosis, and collateral venous development through the pancreaticoduodenal arcade connecting with branches of the hepatic artery.

mal portion of the celiac trunk, about 5 mm away from the abdominal aorta, resulting from compression exerted by the arcuate ligament crossing the vessel (Figure 1). However, of the 13-50% of patients in which this feature was detected, only 1% show serious and persistent compression during inspiration⁷. The treatment of MALS is surgical^{4,8}, with variable results, ranging from laparoscopic ligament section to vascular reconstruction if the compression has damaged the artery wall.

In conclusion, MALS must be suspected in young patients with recurrent abdominal pain, abdominal murmur on exhalation and compatible findings on CT angiography. Recognition is extremely important in multiple trauma patients, since non-visualization of the origin of the celiac trunk is not due to arterial harm, as could be erroneously interpreted.

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Electrocardiography in the early diagnosis of hemodynamic instability

Sir,

Pulmonary embolism is a frequent and severe clinical entity often under-diagnosed because of its non-specific symptoms. Clinical suspicion is required for early diagnosis, allowing adequate treatment to be initiated immediately. Transthoracic echocardiography is non-invasive and allows rapid identification of right ventricle overload or the presence of thrombi, since one can visualize the right chambers and the proximal portion of the pulmonary artery with this method. The echocardiographic morphology of thrombi is characteristic: winding mobile masses with irregular edges. In cases of suspected massive pulmonary thromboembolism with hemodynamic deterioration, echocardiography is without doubt a great weapon to use initially.

A 31 year-old woman attended the ED for an episode of chest pain and sudden dyspnea after 4 days of immobilization. Medical history included morbid obesity and polycystic ovary syndrome treated with oral contraceptives. Physical examination showed tachypnea, low blood pressure (86/40), tachycardia 150 bpm and arterial oxygen saturation of 97%. Electrocardiography showed sinus tachycardia, right bundle branch block and an S1q3 pattern. Within minutes of arrival the patient suffered cardiac arrest due to electromechanical dissociation. Cardiopulmonary resuscitation was administered during 20 minutes. Transthoracic echocardiography showed right ventricle dilatation with moderate dysfunction and severe tricuspid failure, and a hyperechoic image compatible with thrombus at the bifurcation of the

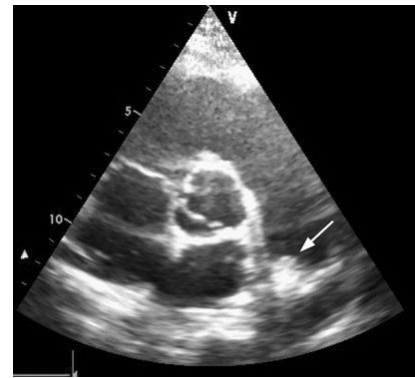


Figure 1. Transthoracic echocardiogram showing a thrombus at the fork of the pulmonary artery (arrow).

pulmonary artery (Figure 1). With a diagnosis of pulmonary embolism, fibrinolytic therapy was administered resulting in hemodynamic stabilization.

This case illustrates the utility of transthoracic echocardiography, since it allows immediate in-situ diagnosis and thus avoids the need to move the patient and the consequent therapeutic delay. In critical cases that would dramatically reduce the chances of survival.

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Toxic shock syndrome due to streptococcal infection after necrotizing myositis

Sir,

Streptococcus Group A (SGA) or *Streptococcus pyogenes* can cause infections ranging from pharyngitis

and mild cutaneous or subcutaneous tissue infection to highly invasive soft tissue infection. It is currently the most common pathogen responsible for these infections in the absence of clear pathways^{1,2} or predisposing factors. Among the highly invasive infections caused, necrotizing fasciitis (NF) and streptococcal myositis are prominent. Differential diagnosis between these entities is difficult in the early stages, but of vital importance given the increased mortality associated with myositis, as well as its greater association with the development of streptococcal toxic shock syndrome (STSS)^{1,6}. The incidence of invasive infection by SGA is 3.5/100.000 persons with a mortality rate of 13.7%, although it must be emphasized that this rate increases to 24% in cases of NF and to 36-50% in cases of STSS²⁻⁴.

There are a number of predisposing factors for the development and progression of infection such as skin lesions, burns, trauma, deliveries, etc. However, up to 50% of SSTS, especially those secondary to NF and myositis, are associated with bacteremia without a clear pathway, suggesting a hematogenous spread, and there is often a history of viral infection in the previous weeks, as well as nonsteroidal anti-inflammatory drugs^{2,3,6}. High systemic toxicity is mediated by the exotoxins A and B and by streptolysins O and S, although M-protein is increasingly linked with the uncontrolled immune response^{9,10}.

A 55 year-old man, ex-smoker during 10 years, with unremarkable medical history except for hypertension, was attended at the ED for pain and swelling in his right leg without prior injury. He reported that the week before this visit he experienced general malaise, myalgia, and generalized pain, without fever, for which he had been treated with nonsteroidal anti-inflammatory drugs. Physical examination showed good general condition, normal blood pressure, temperature and breathing, with pain and Homans sign in the right lower limb but no skin lesions. Doppler ultrasound of the leg was negative for DVT and unremarkable at that time. His clinical condition began to deteriorate rapidly, with tachycardia, tachypnea, respiratory distress, decreased level of consciousness, poor peripheral perfusion and acral cyanosis. Thoracoabdominal and right lower limb (RLL), computed tomography (CT) showed two areas of increased density in the interior wall of the right lung,

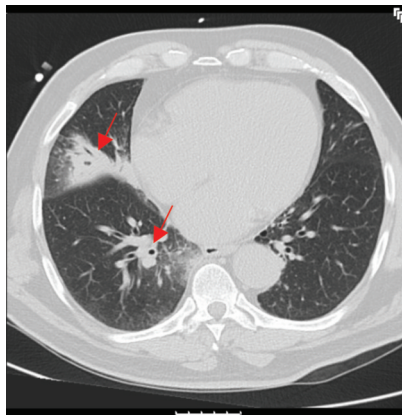


Figure 1. Thoracic CT scan showing abscesses in the right lung wall.

compatible with abscesses and aseptic necrosis (Figure 1), without images suggestive of pulmonary embolism, aortic dissection, or cardiac tamponade. CT scan of the abdomen was unremarkable. CT scan of the RLL (Figure 2) showed an increase in circumference with respect to the left, with edema of soft tissue from the knee to the ankle, without vascular changes, with numerous right inguinal lymph nodes. Laboratory tests showed severe metabolic acidosis, rhabdomyolysis, and 2.4 mg/dl creatinine. The patient was admitted to the unit of intensive care (ICU) with a diagnosis of septic shock and multiorgan dysfunction syndrome of probable soft tissue origin. Blood cultures were ordered and empirical antibiotic therapy was started with iv ceftriaxone, teicoplanin and metronidazole, and linezolid was added later. Clinical condition further deteriorated with progression of multiorgan failure, the appearance of RLL skin lesions, redness and hemorrhagic bullae. He received fine needle aspiration (FNA) of the subcutaneous tissue and Gram stain showed abundant Gram-positive cocci.



Figure 2. CT scan of the right lower limb showing soft tissue edema (arrow).

The patient then underwent emergency surgery with cleaning and surgical debridement, but died 26 hours after arrival. Microbiological results showed *Streptococcus pyogenes* in blood cultures, FNA and bronchoaspiration samples. The pathology report was compatible with acute cellulitis with coccus colonies in subcutaneous cell tissue and diffuse necrotizing myositis with coccus colonies in muscle tissue.

We would emphasize that streptococcal myositis is a rare entity associated with high morbidity and mortality, further compounded by the presence of streptococcal toxic shock syndrome. The diagnosis requires a high level of clinical suspicion, since in many cases the pathway of infection is unclear and the hypothesis of hematogenous dissemination from distant foci seems most likely. The creation of a vaccine that achieves effective immunization against the most aggressive serotypes may help decrease the high rate of mortality associated with these infections.

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Fracture and dislocation of the left shoulder with traumatic hemopneumothorax

Sir,

Shoulder dislocation generally requires an x-ray prior to its reduction, due to the possible existence of asymptomatic associated injuries and complications.

A 60 year-old woman, who had suffered a fall outdoors, attended the ED for left shoulder pain and dysfunction. Medical history included anxiety-depressive syndrome treated with paroxetine and mirtazapine. Vital constants on arrival were: blood pressure 110/65 mm Hg, heart rate 114 bpm, and O₂ sat 91%. Physical examination showed "epaulette" deformity, crepitation in the scapular-humeral articulation with functional loss. Cardiopulmonary auscultation showed decreased vesicular murmur in the left hemithorax and heart sounds were rhythmic. The abdomen was normal. The lower limbs were normal. Lab tests showed leukocytosis 1680/ μ l. with 89.1% neutrophils, normal hematocrit and hemoglobin. Plain x-ray of the chest (Figure 1) showed a fracture and dislocation of the shoulder joint with displacement of the humeral head towards the chest, as well as pleural effusion and subcutaneous emphysema. CT scan of the chest showed hemopneumothorax with rib fractures was completed sacks. The patient was referred to thoracic surgery and traumatology specialists for definitive treatment (Figure 1).

Shoulder dislocation is fairly common in the ED, accounting for almost 50% of major joint dislocations. It can occur by a direct mechanism (uncommon, by direct trauma to the back of the joint) or

by indirect mechanisms (a fall with arm abduction and especially with external rotation). According to the position of the humeral head, it is classified as posterior (95%) or anterior. Sometimes, especially in patients older than 50 years, scapulohumeral luxation can be associated with fractures of the humeral head and neck. The most frequent involve the greater tuberosity, accounting for almost 25% of dislocations. Other complications are the rotator cuff fractures (subscapular muscle), a complication that occurs in 50% of the elderly with this dislocation. It can also be associated with injury of the axillary artery of the radial nerve or the circumflex nerve, causing deltoid muscle paralysis and an area of anesthesia. Axillary nerve lesion occurs in 30% of cases of dislocations and almost always consists of a transient numbness lasting a few weeks.

In our case, there were fairly uncommon complications such as rib fractures and hemopneumothorax due to displacement of humeral head towards the chest, probably secondary to the force of the fall.

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Heat exhaustion associated with language disorder

Sir,

Heatstroke represents a medical emergency defined as a form of hyperthermia associated with systemic inflammatory response leading finally to multiple organ failure, in which encephalopathy predominates¹. Heat exhaustion is a less severe clinical entity where body temperature is usually within normal limits and the central nervous system is usually unaffected². However, we present a case of heat exhaustion associated with speech disorder.

A 27 year-old man with unremarkable medical history except for smoking (20 cigarettes/day), had been performing intense physical work at temperatures between 36 and 40° C. He attended the ED for headache, vomiting, mental confusion and speech disruption. Physical examination showed axillary temperature of 22.5° C, blood pressure 100/60 mmHg and heart rate of 76 bpm. Neurological examination showed space-time disorientation, motor aphasia, phonemics and bilateral reactive mydriasis. Lab tests showed leukocytes 15,110 mm³ with normal formula, hemoglobin 16.2 g/dl and platelets 217,000 cell/mm³. Clotting time was normal. Creatinine kinase was 382 IU/L (24-195); the rest of the plasma biochemical tests were normal. The electro-

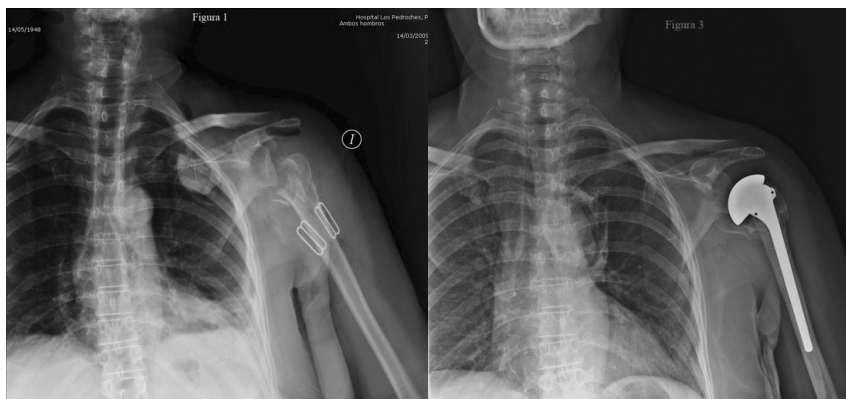


Figure 1. Left: plain chest X-ray showing scapulohumeral fracture and dislocation with a humeral fragment displaced into the chest. Right: Plain chest X-ray showing left shoulder arthroplasty.

cardiogram was normal. Chest x-ray showed no alterations. Cranial computed tomography did not show any pathological image. Cranial magnetic resonance imaging (MRI) showed no anomaly and supra-aortic MRI showed no alteration of flow in the carotid and vertebrobasilar arterial territories, nor in the venous sinuses. The patient recovered after fluid and electrolyte therapy and analgesics.

Heat exhaustion can occur by fluid or mineral salt depletion after exposure to high temperatures and intense physical exercise³. The association of speech disorder with heatstroke has been reported^{4,5} but not with heat exhaustion. There may be a certain genetic component in susceptibility to heat¹. The two entities may in fact be different stages of the same process, so it is not altogether surprising to find neurological effects in some cases of heat exhaustion.

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Adverse drug reactions in the emergency department and the EVADUR study

Sir,

Recently De Andrés et al published "Evaluation of adverse drug events originating in the Emergency Department" in your Journal¹. The authors reported a rate of 13% for adverse drug events (ADE) found in a 3-month observational descriptive study using triggers. They also compared their data with those obtained in the EVADUR study², and offered some comments that we, as authors of the EVADUR study, would like to discuss.

EVADUR was a descriptive, longitudinal, prospective and multicenter study carried out in 21 Spanish emergency departments (EDs) in which we analyzed emergency care in randomly selected patients during 7 different days. We recorded incidents without harm and those with harm or adverse events (AE) associated with ED attention. The global rate of incidents observed in this study was 12%: 1.1% were classified as "near incidents" where the patient was not affected; in another 4.7% the incident occurred but caused no harm, and in 7.2% the incident produced harm. In total, about 505 incidents were detected, and 190 (37.6%) were related to inappropriate medication management (IMM) and of these 60 (32.6%) were near incidents or incidents that did not produce harm to the patient.

The authors found a discrepancy between the values obtained in their work and those described in the EVADUR study. They affirm that our study probably excluded the milder AE, a claim we reject because the methodology allowed us to detect "near incidents" or "incidents without injury" (5.8% of the total number of incidents of the study and 32.6% of the IMM), which Andres et al did not analyze. As they remark, their study focuses on the detection of AE directly caused by drugs, while the EVADUR analyzes any type of AE: medication, procedures, care, problems arising from management or diagnostic problems. Therefore, results are distributed amongst different causal factors so there are different percentage distributions. However, if we group all the causal factors of incidents or AE in the ED using the Pareto diagram, more than 80% of incidents were attributable to four major causes: IMM (27%), procedures and care (29%), diagnostic problems (19%) and communication problems (15%), which results in rates that are more similar to other works³⁻⁵.

Finally, the authors remark that the EVADUR patients were selected through a screening guide which was insufficient to detect safety problems in the ED. The assertion is incorrect, in that the methodology followed in the EVADUR study was different and is clearly described in the published text. The detection of incidents or AE did not depend on the screening guide, since it was applied once all patient data had been

collected after completing their attendance and not before. The objective was to compare its validity, because it had been used in other studies³, by comparison with the method used in the EVADUR, and analyze its predictive values, which, indeed, are insufficient. Claiming that the rate detected was lower for this reason is inaccurate.

In any case we believe that the methodology employed by De Andrés et al (using triggers) is valid for the detection of medication-related AE, as demonstrated in other studies⁶, but would omit near incidents or harmless incidents which, if continuously repeated, could become harmful AE and should be prevented. We agree with the authors about the importance of developing strategies to reduce risks associated with medication in the ED. Conciliation programs⁷ and/or the presence of a pharmacist in the ED⁸⁻⁹ are measures of proven efficiency and necessary in the ED.

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Authors' response

Sir,

With regard to the comments made by the authors of the EVADUR study to our article recently published in *Emergencias*¹, would like to make the following points.

We are aware of the differences between the two studies, not only in terms of design, but also in approach and the methodology used for the detection of adverse events (AE). While the study EVADUR² offers a comprehensive vision that includes various types of AE, our study focuses specifically on those adverse drug events (ADE) caused by medication and is restricted to those events which caused harm to the patient. We believe that these factors contributed to the differences found in AE rates. In any case, despite the limitations of our study (single center and retrospective) it was of particular interest to compare our results with those of the EVADUR study which is considered the publication of reference in the field of ED safety.

With respect to the analysis of near incidents or harmless incidents, we agree about the importance of detection and analysis as a tool for risk management and improvement strategies. These events, although not included in our publication, were also collected during the course of our study and the data are currently being analyzed for future publication. However, there may be nuances in the definitions used to characterize the AE that produced harm. The EVADUR study defined AE as unexpected harm resulting in death, temporary or permanent disability, injury or prolonged hospital stay. In our case, ADE was considered as any event, severe or mild, caused by therapeutic use (including non-use) of a drug³. The clinical criteria used to characterize the harm (mild or se-

vere) were obtained from a previous study of similar design⁴ and all possible cases of harm detected were reviewed by two independent pharmacists and validated by a physician in the Emergency Department. It is possible that these slight differences between the definitions of AE/ADE may explain differences in the incidence of events found.

Regarding the comment about the screening guide, our intention was to stress that, as previously demonstrated^{5,6}, the incidence of AE detected is strongly conditioned by the methodology. All detection methods have advantages and limitations, and a recognized gold standard is not currently available. At no time was our intention to question the validity or usefulness of the method used in the EVADUR study, which we consider entirely appropriate, but rather to reflect comments made by one of the authors in the discussion of our work.

Finally, we agree on the importance of promoting research relating to ED patient safety, the implementation of programs aimed at creating a culture of safety in healthcare environments and the search for tools that help decrease the incidence of AE and their impact on patients.

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Evolution of the quality of research in the Spanish Society of Pediatric Emergency Medicine (SEUP)*

Sir,

The Spanish society of pediatric emergencies (SEUP in Spanish) is one of 23 scientific societies of the Spanish Association of Pediatrics (AEP in Spanish). In the year 2007, we performed a bibliometric analysis of scientific communications presented at SEUP national congresses during the bienniums 2000-2001 and 2005-2006 and conclusions were taken into account as a result of reflection, self-criticism and continuous improvement measures. In the design of this work the objectives were: 1) to quantify the scientific productivity and impact of the SEUP researchers; 2) analyze scientific collaboration and identify collaborative networks. The study and methodology was based on a previous study funded by AEP in 2012², whose preliminary results have been published^{3,4}. We identified four methodological sections of interest:

1. Selection of databases: Science Citation Index-Expanded (SCI-E), Scopus, Spanish medical index (IME) and the Spanish Bibliographic Index in Health Sciences (IBECS) during the five-year period 2006-2010. The documents analyzed are original articles and reviews, editorials and letters.

2. Strategy for the recovery of documents: in SCI-E through 95 journals in the area of Pediatrics of the Journal Citation Reports (JCR) and in Scopus the 197 journals included in the Scimago Journal Rank (SJR). Then we identified the Spanish pediatric scientific production published in other area journals of the JCR. In the national databases IME and IBECS, searches were limited to the journals not included in SCI-E and Scopus.

3. Normalization of data on authors and institutions. SEUP was re-

*Presentado parcialmente como ponencia en la 18 Reunión de la Sociedad Española de Urgencias de Pediatría, Granada, 26 de abril de 2013.

requested to provide, from the total list of members (476 in March 2013), the names of those considered to have a consolidated line of research (47 researchers).

4. Bibliometric indicators: scientific productivity (number of articles, articles published in Spanish and foreign journals), impact (citations received by the authors in SCI-E and Scopus) and collaboration (network of co-authorship with at least 10 works and a minimum of 5 works performed collaboratively).

The main results are grouped into three types of Bibliometric indicators:

a) Indicators of productivity (Table 1): in the group of 17 authors with 5 or more scientific publications, there are 4 SEUP pediatricians from Hospital San Juan de Dios (Barcelona), 4 from the University Hospital Cruces (Vizcaya) and 3 from Hospital Gregorio Marañón (Madrid). The highest producers in national journals are Carles Luaces (40 articles), Victoria Trenchs (26) and Jordi Pou (20). The highest producers in foreign journals are Javier Benito (14), Santiago Mintegi (13) and Jordi Pou (9). Spanish journals with the largest number of publications are *Anales de Pediatría* 118 articles, *Acta Pediatría Española* (33) and *Pediatría Catalana* (16). The foreign journals with the largest number of publications are *Pediatric Emergency Care* with 21 articles, *European Journal of Emergency Medicine* (14) and *Pediatric Infectious Disease Journal* (14).

b) Impact indicators: Table 1 shows the citations received for pa-

pers published by the most productive authors of SEUP, both in SCI-E and in Scopus.

c) Collaborative networks: the major networks bring together 27 and 19 authors. In these networks, linking is established mainly between three hospitals: San Juan de Dios, Cruces and Gregorio Marañón.

On analysis of these bibliometric indicators^{5,6} we offer the following reflections on research and scientific publication within SEUP:

1) Great dispersion of scientific journals, mostly Bradford publications in Spanish journals (half of the articles are published in *Anales de Pediatría*) and in foreign journals (more than half of the articles are published in three journals).

2) Only 17 authors (3.6% of the total members of SEUP) have published at least one article per year during the study period.

3) Preference for publication in English, but without prejudice to quality publication in Spanish^{7,8}. In the case of SEUP, a noteworthy journal is *Emergencias* (Impact Factor for 2012: 2.578 and located in the first quartile of the area of Emergency Medicine of JCR) and the journal *Anales de Pediatría* (IF for 2012: 0.867 and located in the fourth quartile in the area of Pediatrics of JCR).

– Knowledge of networks is an objective way to plan research and benchmarking strategies in pediatric research in the SEUP setting.

– The current research network the Spanish society of pediatric emergencies (RISeuP-SPERG)⁹ is a

great opportunity, because it was born to facilitate coordinated multi-center studies with strong epidemiological designs, important sample sizes, collaboration with epidemiologists and biostatisticians, and dissemination in journals with an impact factor.

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Table 1. Bibliometric indicators for the most productive SEUP authors: 2006-2010

| Authors | Institution | Nºarticles* | Citations** |
|------------------------------------|------------------------------------|-------------|-------------|
| Luaces Cubells, Carlos | H. San Juan de Dios (Barcelona) | 48/40/8 | 20/28 |
| Trenchs Sáinz de la Maza, Victoria | H. San Juan de Dios (Barcelona) | 34/26/8 | 24/31 |
| Pou Fernández, Jordi | H. San Juan de Dios (Barcelona) | 29/20/9 | 44/53 |
| Benito Fernández, Javier | H. de Cruces (Vizcaya) | 25/11/14 | 51/101 |
| Mintegi, Santiago | H. de Cruces (Vizcaya) | 21/8/13 | 54/95 |
| Ferres Serrat, Francesc | H. Son Espases (Palma de Mallorca) | 17/14/3 | 20/31 |
| Marañón Pardillo, Rafael | H. Gregorio Marañón (Madrid) | 17/17/0 | 2/19 |
| Vázquez López, Paula | H. Gregorio Marañón (Madrid) | 17/15/2 | 21/45 |
| Campos Calleja, Carmen | H. Miguel Servet (Zaragoza) | 15/15/0 | 0/18 |
| Claret Teruel, Gemma | H. San Juan de Dios (Barcelona) | 15/8/7 | 26/34 |
| Míguez Navarro, Concepción | H. Gregorio Marañón (Madrid) | 11/10/1 | 2/17 |
| Manrique Martínez, Ignacio | H. 9 de Octubre (Valencia) | 8/8/0 | 0/4 |
| Loscertales Abril, Mercedes | H. Virgen del Rocío (Sevilla) | 7/6/1 | 4/5 |
| Rodríguez Suárez, Julián | H. Central de Asturias (Asturias) | 7/6/1 | 1/6 |
| Palacios Cuesta, Alba | H. 12 de Octubre (Madrid) | 6/5/1 | 1/3 |
| Gómez, Borja | H. de Cruces (Vizcaya) | 6/2/4 | 18/27 |
| Capapé Zache, Susana | H. de Cruces (Vizcaya) | 5/2/3 | 12/19 |

*Total/Spanish journals/foreign journals. **SCI-E/Scopus.

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Psychiatric emergencies and the full moon

Sir,

Numerous studies have suggested a possible relationship between phases of the moon and the number of psychiatric consultations attended in the emergency department (ED)¹. Rivera et al, in a letter to the editor published in this Journal, observed an increase in male patients treated in the psychiatric ED and a decrease in attempted suicide during the full moon period (FMP)². Our group has reported increased visits to the psychiatric ED associated with higher temperature or humidity changes³. We have performed a new analysis of our data base in order to compare, as far as possible, the findings of Rivera et al with our findings.

We studied 3,048 visits to the ED of our Institut Pere Mata de Reus between January 1, 2003 and December 31, 2005. The methodology used and the characteristics of the sample are described in a previous publication³. We added the FMP variable, using the definition of Rivera et al., a period of 4 days, which extends from the day before full moon to two days after full moon.

The main results are shown in Table 1. During the FMP, male pa-

tients and schizophrenic disorders were over-represented, and neurotic disorders were under-represented. There were no differences for other diagnoses such as organic psychosis, affective psychosis, personality disorder, drug disorders, eating disorder, sleep disorder or reaction to stress. Since males predominated in schizophrenic disorders (70.9%; $p < 0.001$) and constituted a minority of neurotic disorders (37.6%; $p < 0.001$), we studied the relationship between these two disorders and FMP separately for men and women. Over-representation of schizophrenic disorders and under-representation of neurotic disorders during the FMP persisted, but was only statistically significant in men.

We corroborated the observation by Rivera et al of a greater presence of male patients during the FMP². Men with schizophrenic disorders attended the psychiatric ED more often during the FMP and men with neurotic disorders did so less often. These associations were not observed by Weaver et al¹; however Barr showed a relationship between the full moon and worsening of patients with schizophrenia⁴. Although schizophrenic patients in our sample showed the highest rate of hospitalization³, the association with the FMP is not of sufficient magnitude to affirm increased hospitalization during this period.

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Applicability of guidelines in routine clinical practice

Sir,

We have read with interest the article by Julian-Jiménez et al¹ on the implementation of a clinical practice guideline (CPG) for the management of community acquired pneumonia (CAP) in an emergency department (ED), associated with significant improvement in the whole health care process and cost savings². Current clinical management requires useful, relevant and reliable information³. The ED is an area with high risk of incidents and adverse events endangering patient safety⁴, and a CPG may help reduce such risk.

The CPG can be defined as a series of systematic recommendations, based on the best evidence from the medical literature, made in order to assist the physician in making decisions for patients with a certain disease, through the adoption of certain practices and specific behaviors. The ultimate objective of this set of recommendations is to improve the efficiency and quality of care, reduce the proportion of inappropriate decisions and incorporate the latest advances in technology and knowledge to daily clinical practice⁵. The implementation of a CPG requires great effort, often in the context of limited resources and an existing institutional culture; it also requires continuous evaluation and review to achieve the maximum desired effect. As stressed by the authors, the beneficial effects

Table 1. Demographic and clinical characteristics of patients visiting the psychiatric emergency department (ED); comparison of full moon period (FMP) versus non-full moon period

| | Global | FMP | Non-FMP | P |
|--------------------------------------|---------------|-------------|--------------|-------|
| Days (n) | 1,095 | 148 | 947 | |
| Visits to the ED (n) | 3,446 | 3,048 | 398 | 2,650 |
| Visits to the ED per day (mean ± SD) | 2.8 ± 1.7 | 2.7 ± 1.9 | 2.8 ± 1.7 | 0.481 |
| Admissions per day (mean ± SD) | 3,048 | 398 | 2,650 | |
| Age [mean (SD)] | 39 (16) | 40 (16) | 39 (16) | 0.742 |
| Men [n (%)] | 1,504 (49.3%) | 215 (54.0%) | 1289 (48.6%) | 0.045 |
| Schizophrenic disorders [n (%)] | 457 (15.0%) | 77 (19.3%) | 380 (14.3%) | 0.009 |
| Neurotic disorders [n (%)] | 782 (25.7%) | 80 (20.1%) | 702 (26.5%) | 0.006 |
| Men | | | | |
| Schizophrenic disorders [n (%)] | 324 (21.5%) | 59 (27.4%) | 265 (20.6%) | 0.023 |
| Neurotic disorders [n (%)] | 294 (19.5%) | 31 (14.4%) | 263 (20.4%) | 0.041 |
| Women | | | | |
| Schizophrenic disorders [n (%)] | 133 (8.6%) | 18 (9.8%) | 115 (8.4%) | 0.530 |
| Neurotic disorders [n (%)] | 488 (31.6%) | 49 (26.8%) | 439 (32.3%) | 0.134 |

FMP: Full moon period; SD: standard deviation.

are lost over time and it is necessary to periodically repeat training courses to maintain or reinforce them.

A systematic literature review⁶ showed that effective strategies often have multiple components and the use of single strategy, such as an educational intervention, is less effective. For example, the characteristics of the guidelines subsequently affect its actual use. Those that are easy to understand and do not require specific resources are more likely to be implemented. Patient characteristics can also influence the result, since greater comorbidity reduces the possibility of recommendations being followed. Finally, lack of support from colleagues or superiors can be major impediments.

Cabane et al⁷ evaluated the major barriers to protocol adherence by the physician, using up to 120 different types of surveys. The authors describe a total of 293 potential barriers, classified according to medical knowledge of the guidelines (lack of awareness or lack of familiarity), attitudes towards them (disagreement with the recommendations, negative expectations regarding anticipated outcomes, perception of low efficiency and lack of motivation, habitual practice or established routines) or physician behavior due to external barriers (patient-related factors, conflicting advice, environmental factors such as the lack of time or resources and the limitations of the organization).

Adherence to CPGs in clinical experience is low⁸. Implementation and enforcement of the CPG are only parts of a process from planning and development of guidelines for full implementation, and that includes the identification of possible obstacles to its acceptance and widespread adoption. Recognition of the complexity of the process and the various factors involved can improve long-term application of guideline recommendations and quality of care for patients with CAP or other diseases.

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Challenge of changing physicians' habits

Sir,

The study by Julian-Jiménez et al¹, involving four different phases, describes the complex process of implementing a clinical practice guideline (CPG) for the management of community-acquired pneumonia (CAP) in the ED. The study has led us to reflect on the difficulty of changing the habits of physicians in general and emergency physicians in particular, and the need for continual interventions to achieve these changes. The EAHFE registry was initiated 6 years ago by the ICA-SEMES research group; it had three phases for the inclusion of patients with acute heart failure (ICA in Spanish): in 2007 EAHFE-1 with 1,017 patients; in 2009 EAHFE-2 with 1,483 patients; and in 2011 EAHFE-3 with 3,414 patients. This journal has recently published part of the results²⁻⁵. One of the sub-optimal findings identified from the outset was that troponin determination was performed in less than half

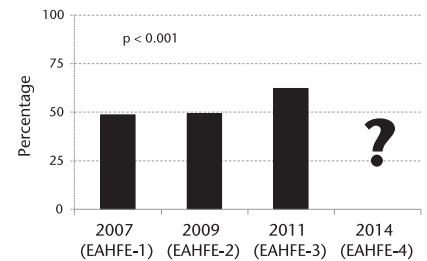


Figure 1. Evolution of troponin determination for acute heart failure patients treated in the Emergency Department of Spanish hospitals. The p value was calculated using chi squared test for the values of EAHFE 1, 2 and 3 registries.

EAHFE-1), despite being a widespread recommendation in clinical guidelines^{6,7}. After publication of these results and insistence on the need for troponin determination, the second phase (EAHFE-2) results showed no significant improvement. Our group subsequently elaborated clinical guidelines for the treatment of heart failure⁶. Dissemination of the guidelines, insistence on the need for compliance at each of the ICA-SEMES meetings and perseverance by members of the group in their respective hospitals have significantly improved the results (EAHFE-3) (Figure 1). Our experience exemplifies two aspects: change of habits is a slow process, and insistence on training interventions leads to success. This is most relevant and necessary in emergency departments, characterized by high care activity and increased risk of adverse events. Time will tell whether all these training strategies help maintain the upward trend in troponin determination in the next EAHFE-4 phase, planned for 2014.

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Authors' reply

Sir,
We appreciate the comments by González del Castillo et al and Escoda

and Llorens about certain aspects of our article¹, recently published in *Emergencias*, on improving the care of patients with community-acquired pneumonia (CAP) after implementation of a clinical practice guideline (CPG) in the emergency department (ED).

The implementation of the GPC resulted in important benefits for patient, but also for the system. Improved decision-making on discharge or admission², the choice of antibiotic, the time and place of treatment (hospital or home)³ means significant reduction in morbidity, mortality and adverse effects of treatment, which directly affects the safety of the patient⁴ and the decreases the probability of iatrogenic harm⁵. In addition, greater efficiency was achieved: reduced hospital stay and duration of antibiotic treatment meant cost savings calculated as approximately 100,000 euros during the study period, in line with data reported by other authors⁶.

Given this scenario, it is inexplicable and disturbing that around 50% of emergency physicians admit knowing the guidelines but do not adhere or follow the recommendations on CAP management in their centers^{7,8}. In our study, before the first educational intervention, adherence to the CPG was only 30% and, when we asked our colleagues about the reasons for this, we got no response in most cases. As rightly suggested by González del Castillo et al, we are convinced that training interventions must be carried out before and after CPG implementation to achieve and maintain its beneficial effects, and the barriers to adherence must be analyzed to be able to tackle them. As shown by Dean et al⁵, a mere 10% increase in CAP guideline

adherence by professionals leads to decreased morbidity and mortality. It is therefore necessary to persevere in time, because success manifests over the medium and long-term, as shown by Escoda and Llorens.

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