

LETTERS TO THE EDITOR

Catheter-directed thrombolysis in upper-extremity deep vein thrombosis

Trombolisis local dirigida en una trombosis venosa profunda del miembro superior

Sir,

Deep vein thrombosis (DVT) of the upper extremities is rare but increasing in frequency. Advanced oncological disease or central venous lines predispose to secondary DVT, while the primary form usually occurs in young sportsmen and women¹. Anticoagulation reduces the risk of early complications such as pulmonary embolism. Catheter-directed fibrinolysis provides satisfactory results if performed urgently, and can be combined with angioplasty for complete revascularization².

A 25 year-old male athlete, with unremarkable medical history, consulted for spontaneous axillary pain of the right upper limb during 3 days, increased perimeter and blotching without trauma. For clinical and analytical reasons, we ruled out fibrillar rupture, tendinopathy, compartment syndrome and myositis. D-dimer was 1,097 ng / ml, and venous Doppler ultrasound confirmed occlusive DVT of the subclavian and axillary veins. In addition to anticoagulation, fibrinolysis was performed using a 7 cm infusion catheter in the distal portion of the thrombus (Figure 1). At 24 hours, venography showed marked decrease of the thrombus and subclavian stenosis that required balloon dilatation. Doppler ultrasound performed 15 days later confirmed total resolution of the thrombus. The patient completed a course of anticoagulation during 6 months.

Up to 4-10% of all DVT occur in the brachial, axillary or subclavian venous system³. It appears spontaneously after strenuous upper limb activity (Paget-Schroetter syndrome) or secondary to underlying causes (central line, cancerous process or clotting abnormalities⁴).

Symptoms are similar in both forms (thickening, redness, blotching). The primary form is more common in young bodybuilders, due to repeated microtrauma of the venous endothelium and abnormal activation of the coagulation cascade⁵. Anatomic narrowing of the costoclavicular space predisposes to this con-

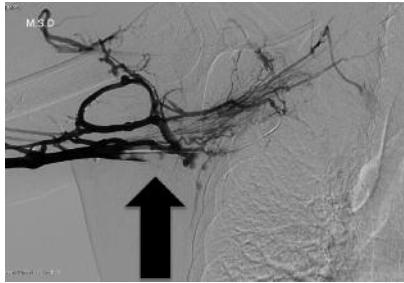


Figure 1. Confirmation of axillo-subclavian vein thrombosis.

dition.

Doppler ultrasound is the diagnostic test of choice. Frequent complications include pulmonary embolism (36%), local post-thrombotic sequelae and recurrent thromboembolism. Early heparin treatment followed by oral anticoagulation are recommended⁶.

Catheter-directed thrombolysis has the same benefits as systemic thrombolysis but the safety profile is greater since the dose of fibrinolytic is lower. The combination with mechanical thrombectomy appears to decrease time and cost of the procedure with fewer post-thrombotic sequelae^{7,8}.

Although there are studies suggesting the superiority of these techniques versus anticoagulation alone⁹, there is no consensus on the treatment of choice for upper extremities. Currently the recommendation is anticoagulation alone or combined with angioplasty, stenting or even surgical decompression, with individualized treatment according to the patient, the risk of bleeding and severity of the thrombus¹⁰.

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References

- 1 Grant JD, Stevens SM, Woller SC, Lee EW, Kee ST, Liu DM, et al. Diagnosis and management of upper extremity deep-vein thrombosis in adults. *Thromb Haemost.* 2012;108:1097-108.
- 2 Enden T, Klow NE, Sandvik L, Slagsvold CE,

Ghanima W, Hafsahl G, et al. Catheter-directed thrombolysis vs. anticoagulant therapy alone in deep vein thrombosis: results of an open randomized, controlled trial reporting on short-term patency. *J Thromb Haemost.* 2009;7:1268-75.

- 3 Spiezia L, Simone P. Upper extremity deep vein thrombosis. *Intern Emerg Med.* 2010; 5:103-9.
- 4 Klitfod L, Broholm R, Baekgaard N. Deep venous thrombosis of the upper extremity. A review. *International Angiology.* 2013; 32:447-52.
- 5 Alla VM, Natarajan N, Kaushik M, Warriar R, Nair CK. Paget-Schroetter Syndrome: Review of Pathogenesis and Treatment of Effort Thrombosis. *West J Emerg Med.* 2010; 11:358-62.
- 6 Bernardi E, Piccioli A, Marchiori A, Girolami B, Prandoni P. Upper extremity deep vein thrombosis: risk factors, diagnosis, and management. *Semin Vasc Med.* 2001;1:105-10.
- 7 Kim HS, Patra A, Paxton BE, Khan J, Streiff MB. Adjunctive percutaneous mechanical thrombectomy for lower-extremity deep vein thrombosis: Clinical and economic outcomes. *J Vasc Interv Radiol.* 2006;17:1099-104.
- 8 Grunwald MR, Hofmann LV. Comparison of urokinase, alteplase, and reteplase for catheter-directed thrombolysis of deep venous thrombosis. *J Vasc Interv Radiol.* 2004; 15:347-52.
- 9 Sharifi M, Mehdipour M, Bay C, Smith G, Sharifi J. Endovenous therapy for deep venous thrombosis: the TORPEDO Trial. *Catheter Cardiovasc Interv.* 2010;76:316-25.
- 10 Kearon C, Akl EA, Comerota AJ, Prandoni P, Bounameaux H, Goldhaber SZ, et al. Antithrombotic Therapy for VTE Disease: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. *Chest.* 2012;141(Suppl. 2):e419S-e494S.

Acute myocardial infarction with ST-segment elevation as an early sign of relapse in subacute (De Quervaine) thyroiditis

Infarto agudo de miocardio con elevación del segmento ST como recaída temprana de una tiroiditis subaguda de De Quervain

Sir,

Excess cardiovascular thyroid hormone is associated with a wide spectrum of clinical events that complicate the diagnosis^{1,2}. We report the case of a young woman with acute myocardial infarction (AMI) with normal coronary arteries during an episode of thyrotoxicosis due to early relapse of De Quervain subacute thyroiditis.

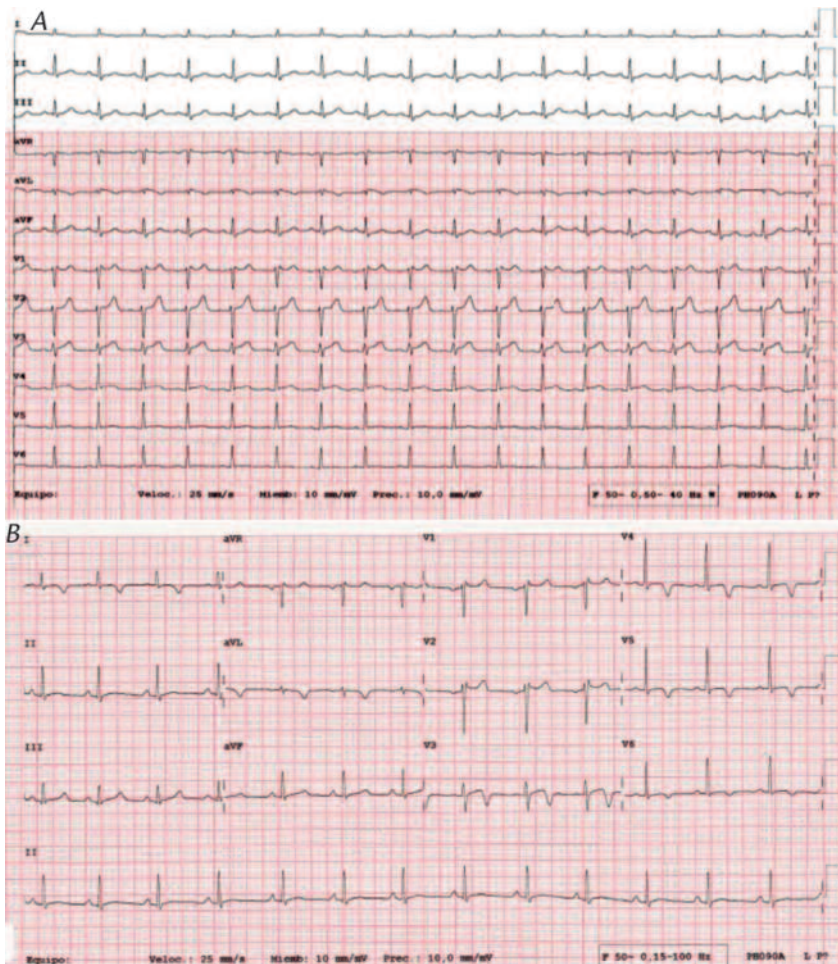


Figure 1. A) Electrocardiogram of the patient with chest pain on arrival at the emergency department. B) Electrocardiogram 48 hours later.

A 32 year old woman visited the ED for central oppressive, non-irradiating chest pain associated with feeling nauseous and sweating during 6 hours. She had a history of primary hypothyroidism with negative autoimmunity, on L-thyroxine treatment. She had no risk factors or family history of cardiovascular disease. Five days before she had been diagnosed with De Quervain subacute thyroiditis following cervical pain with enlargement of the thyroid gland and fever. Non-steroidal anti-inflammatory treatment was prescribed and the dose of L-thyroxine was maintained. The electrocardiogram (ECG) on ED admission showed sinus tachycardia and anterolateral ST segment elevation (Figure 1A) with ischemic evolutionary changes of the T wave (Figure 1B), and lab tests showed ultrasensitive troponin T of 128 ng / ml at admission and 257 ng / ml at 48 hours (p99 method 14 ng / mL), and hyperthyroid state (free T3 13.8 pg / ml, T4 5.95 ng / dl, TSH 0.016 uU / ml). Echocardiography showed no alterations in segmental myocardial contractility and coronary angiography showed the presence of a

coronary tree with no lesions or spasm.

The final diagnosis was an episode of thyrotoxicosis due to early relapse of subacute thyroiditis. Treatment with propranolol and prednisone was initiated. The clinical course was favorable with a decrease of biomarkers of myocardial damage and normalization of ECG findings.

In De Quervain subacute thyroiditis, 50% of patients develop symptoms of thyrotoxicosis during which myocardial ischemia may occur by different phenomena. Vasospasm is a main cause in cases with coronary arteries without significant lesions^{4,6}. Therefore, it would be classified as AMI 2 according to the current definition⁷. Cardiac involvement is variable, from mild forms to cardiogenic shock⁸; however, most reported cases present little involvement of ventricular function and good prognosis⁹. Restoring the euthyroid state is the basis of treatment, to treat the symptoms and re-

verse the hormone effects on the cardiovascular system¹⁰.

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References

- 1 Klein I, Danzi S. Thyroid disease and heart. *Circulation*. 2007;116:1725-35.
- 2 Klein I, Ojamaa K. Thyroid hormone and the cardiovascular system. *N Engl J Med*. 2001;344:501-9.
- 3 Pearce EN, Farwell AP, Braverman LE. Thyroiditis. *N Engl J Med*. 2003;348:2646-55.
- 4 Kim HJ, Jung TS, Hahm JR, Hwang SJ, Lee SM, Jung JH, et al. Thyrotoxicosis-induced acute myocardial infarction due to painless thyroiditis. *Thyroid*. 2011;21:1149-51.
- 5 Choi YH, Chung JH, Bae SW, Lee WH, Jeong EM, Kang MG, et al. Severe coronary artery spasm can be associated with hyperthyroidism. *Coron Artery Dis*. 2005;16:135-9.
- 6 Masani ND, Northridge DB, Hall RJ. Severe coronary vasospasm associated with hyperthyroidism causing myocardial infarction. *Br Heart J*. 1995;74:700-1.
- 7 Thygesen K, Alpert JS, Jaffe AS, Simoons ML, Chaitman BR, White HD. Third universal definition of myocardial infarction. *Glob Heart*. 2012;7:275-95.
- 8 Lassnig E, Berent R, Auer J, Eber B. Cardiogenic shock due to myocardial infarction caused by coronary vasospasm associated with hyperthyroidism. *Int J Cardiol*. 2003;90:333-5.
- 9 Agewall S, Tornvall P. Thyroid dysfunction in patients with myocardial infarction with normal coronary arteries. *Angiology*. 2013;64:245-6.
- 10 Osman F, Franklyn JA, Holder RL, Sheppard MC, Gammage MD. Cardiovascular manifestations of hyperthyroidism before and after antithyroid therapy: a matched case-control study. *J Am Coll Cardiol*. 2007;49:71-81.

Lessons learned in a simulation of hospital resource management during a catastrophe

Lecciones aprendidas en la gestión de capacidades hospitalarias ante una catástrofe

Sir,

In accidents with multiple victims, major emergencies or disasters, each health service applies the

relevant health action plan, integrated into the respective territorial emergency plans; but in general, these action plans are less developed in the section of hospital management, as they are more focused on urgent pre-hospital care. Information flow from prehospital and hospital units, the use of a common language and knowledge of mutual needs and capabilities must be previously established to guarantee better control of the initial chaos inherent to these situations. That chaos is mainly controlled by early reorganization of the entire system, which will react faster the higher its adaptive flexibility and practice.

In Castilla-La Mancha we performed a simulated catastrophe drill in conjunction with the Emergency Daimiel Military Unit (Ciudad Real) during the weekdays between 9 and 12 March 2015. This exercise contemplated a series of catastrophic events starting from an imaginary petrochemical explosion, generating some 805 emergency patients. Among the measures adopted in this unfavorable scenario, casualties were referred to different hospitals, with mild cases sent to primary care centers, simulated suppression of programmed medical transport to facilitate ambulance arrival at the scene of the disaster and blood stock-taking available in the whole community. During the first moments, we actively sought beds available in our community hospitals and then in the nearest other communities. This search of hospital capabilities was conducted in real time, so that the hospitals and their respective crisis committees were involved in generating free beds for the supposed catastrophe (Table 1).

In parallel to the initial management of beds, there was an internal exercise at each hospital to multiply their capabilities through two strategies: 1) Direct expansion of the number of beds with the incorporation of wards for epidemics (flu, etc.), generating an additional 457 beds; and 2) by forcing discharge of "dischargeable" patients occupying beds in all hospital departments, thus generating 397 more beds. Dischargeable patients were considered to be those who, after medical assessment, could interrupt their hospital stay given the great emergency situation / catastrophe,

Table 1. Beds freed for use in disasters

	Nº
Hospital beds	
Castilla-La Mancha	390
ICU-monitoring beds*	
Castilla-La Mancha	93
Hospital beds	
Other communities	662
ICU-monitoring beds*	
communities	64

ICU: intensive care unit. **"ICU-monitoring" = ICU beds in hospitals, plus those in postsurgical, resuscitation and ED observation units, and any other beds which are equipped to continuously monitor vital signs and can be used for this purpose in the event of a major catastrophe generating many casualties.

and receive home hospitalization, telephone monitoring and / or visit primary care centers, all with a personalized patient plan (PPP). The minimum content was: 1) a discharge report where the reasons for early discharge were reflected; 2) informed consent; 3) continuity of nursing care plan; 4) responsible carer/s; 5) a complications alert system; 6) telephone contact with the hospital department in case of incidents; and 7) check-up appointment if possible at the time.

These two concepts, as well as beds in intensive care units (ICU) or beds with monitoring capability, and dischargeable patients in the context of a catastrophe, with the requirements for their safety during early discharge, are some of the lessons learned in this exercise. They now form part of our community health plan of action for major emergencies and catastrophes, involving the coordination of prehospital and hospital resources.

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References

- 1 De Boer J. An attempt at more accurate estimation of the number of ambulances needed at disaster in the Netherlands. *Prehospital Disaster Medicine*. 1996;11:125-8.
- 2 De Boer J. Order in Chaos: modellin, medical management in disaster. *Eur J Emerg*

Med. 1999;6:141-8.

3 Álvarez Leiva C. La Gestión del caos. En: *Manual de Atención a Múltiples Víctimas y Catástrofes*. Madrid: Arán Ediciones; 2002. pp. 45-54.

4 Sánchez Losada JA, Caamiña García M, Jiménez Carrascosa JF, Touza Garma B, Romero Sánchez S, Gregorio Sanz M, et al. Modelo de respuesta inmediata ante grandes emergencias para la atención sanitaria en entornos de dispersión geográfica puesta al día en urgencias, emergencias y catástrofes. *Puesta Día Urgenc Emerg Catast*. 2009;9:78-88.

Adherence to clinical practice guidelines in prehospital care of atrial fibrillation: the experience of emergency paramedic teams

Adecuación de la asistencia extrahospitalaria de la fibrilación auricular a las guías de práctica clínica. Experiencia de los equipos de emergencias

Sir,

Atrial fibrillation (AF) is highly prevalent¹ and increasing^{2,3}, representing a considerable socio-economic burden⁴. Most cases are initially assessed by Primary Care physicians, emergency mobile units and hospital emergency departments (EDs). We have a varied arsenal for pharmacological treatment which partly explains the significant heterogeneity of clinical approaches^{5,6}. We performed a retrospective analysis of the treatment applied and results for heart rate and rhythm control in a random sample of patients with AF treated by emergency teams. We evaluated the appropriateness of anticoagulation, rhythm control and cardioversion using the synthetic index of therapeutic adequacy (SITA) (Table 1) which rates assistance with values between -3 and 3 according to compliance in each phase of treatment with recommendations made by SEMES-SEC and the European guidelines^{7,8}.

We studied 236 patients, 62% men and 38% women who were significantly younger (66 vs 75 years); 43.8% were first episodes. Mean time to attendance was 74 minutes. The most frequent comorbidities were hypertension (HT) (64%), heart disease (41.1%) and diabetes (30.1%). The treatment drug most often used was amiodarone (45% to reduce heart rate and 81% as an antiarrhythmic). We found that only 16.1% of the

Table 1. Level of compliance with guidelines in the three steps of treatment. SITA scores and percentage of compliance in each treatment situation

	-1	0	1
Anticoagulation	* No anticoagulation, without justification. 38%	*The patient was taking an oral anticoagulant. 22%	*Appropriate anticoagulation was used. 40%
Rhythm control	* No beta blockers/calcium antagonists prescribed despite indication. *The drug of choice was not used, without cause or contraindication. 32%	* The drug of choice was not used but the action was not incorrect. * The drug of choice was not used but the one being taken by the patient. 2%	* The drug of choice was used. * The drug of choice was not used but with justification. * Beta blockers/calcium antagonists were not needed and correctly not prescribed. 66%
Cardioversion	* No cardioversion, despite indication. * The drug of choice was not used, without cause or contraindication. 43%		* The drug of choice was used. * Cardioversion was not needed and correctly not applied. 55%

sample received assistance with full compliance with clinical practice guidelines (SITA 3) and 63.1% with partial positive compliance (SITA 1-2); most clinical variability occurred reducing heart rate. Compliance with the recommendations was 62.3% for anticoagulation, 68.2% for heart rate reduction and 56.8% for cardioversion. Rate control was found in 40.7% and almost all patients (96%) were hospitalized.

In conclusion, we detected a need to increase the rate of anticoagulation and the use of first choice drugs (beta blockers/calcium antagonists) to replace amiodarone in these episodes of acute AF. In terms of evaluation tools, SITA is simple and easy to use, allowing the detection of non-compliance with clinical guideline recommendations.

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References

- Gómez-Doblas JJ, Muñiz J, Alonso M JJ, Rodríguez-Roca G, Lobos JM, Awamleh P, et al. Prevalencia de fibrilación auricular en España. Resultados del estudio OFRECE. *Rev Esp Cardiol.* 2014;67:259-69.
- Giménez-García E, Clua-Espuny J, Bosch-Príncipe R, López-Pablo C, Lechuga-Durán I, Gallofré-López M, et al. El circuito asistencial de la fibrilación auricular en pacientes ambulatorios: estudio observacional Audit FA en el Baix Ebre. *Aten Primaria.* 2014;46:58-67.
- Russo V, Navarín S, Zampini G, Magrini L, Mann C, Muiesan ML, et al. Management of atrial fibrillation in the Emergency Department: current approach and future expectations. *Eur*

Rev Med Pharmacol Sci. 2013;17:3132-47.

- Montes-Santiago J, Rodil V, Formiga F, Cepeda JM, Urrutia A. Características y costes de los pacientes ingresados por arritmias cardiacas en España. *Rev Clin Esp.* 2013;213:235-9.
- Camm AJ, YH Lip G, De Caterina R, Savelieva I, Atar D, Hohnloser SH, et al. Actualización detallada de las guías de la ESC para el manejo de la FA de 2012. *Rev Esp Cardiol.* 2013;66:54:e1-e24.
- Coll-Vinent B, Junyent M, Orús J, Villaruel C, Casademont J, Miró O, et al. Tratamiento de la FA en distintos niveles asistenciales de un área sanitaria. *Med Clin (Barc).* 2007;128:125-9.
- Martín Martín A, Fernández Lozano I, Coll-Vinent Puig B, Tercedor Sánchez L, Del Arco GC, Arribas YF, et al. Manejo de los pacientes con FA en los servicios de urgencias hospitalarios (actualización 2012). *Emergencias.* 2012;24:300-24.
- Camm AJ, Kirchhof P, YH Lip G, Schotten U, Savelieva I, Ernst S, et al. Guidelines for the management of atrial fibrillation. *Eur Heart J.* 2010;31:2369-429.

120 ms and a right bundle branch block (RBBB) pattern with right axis (Figure 1A and B). This was interpreted as paroxysmal supraventricular tachycardia (SVT). He received 3 adenosine boluses with no response; after amiodarone, sinus rhythm was observed (Figure 1C). He was discharged from the ED and referred for ambulatory cardiology control. During follow-up an ECG was performed which appeared normal and he was prescribed treatment with atenolol and propafenone. Episodes persisted, so he was hospitalized in order to perform a complete study. During hospitalization, he initiated treatment with verapamil due to a suspected diagnosis of fascicular VT and the patient was asymptomatic. Cardiac MRI was normal and electrophysiology confirmed the diagnosis of VT of left anterior bundle branch origin. The clinical picture resolved with radiofrequency ablation.

About 10% of VT in structurally healthy hearts is considered idiopathic; 10-12% are fascicular left VT (FLVT)³. This is a reentrant tachycardia originating in the left bundle branch, and presents with a relatively narrow QRS segment (typically <140 ms) and may be mistaken for SVT. Typically they are monomorphic VT, sustained and sensitive to verapamil, occurring in healthy children or young adults. Most episodes occur at rest, but they can be triggered by exercise, emotional stress and catecholamine infusion. The prognosis is good⁴.

Electrophysiology confirms the fascicular origin, and two types have been described^{4,5}: posterior FLVT constitutes 90-95% of cases, presenting QRS morphology with RBBB and left axis; and anterior FLVT which is rare, with RBBB morphology and right axis in the ECG. Usually they respond to verapamil. Catheter ablation is curative in over 90% of cases.

Relatively narrow QRS ventricular tachycardia

Taquicardia ventricular con QRS relativamente estrecho

Sir,

Ventricular tachycardia (VT) usually presents with a wide QRS segment on the electrocardiogram, defined by a QRS duration > 120 ms^{1,2}. However, VT of high septal or fascicular origin may present with a narrow QRS, so it can be erroneously treated on assuming a supraventricular origin.

A 45 year-old man, with unremarkable history, reported recurrent palpitations during one month with good hemodynamic tolerance. In an ECG performed after one of these episodes, regular monomorphic tachycardia of 150 bpm was observed, with QRS of

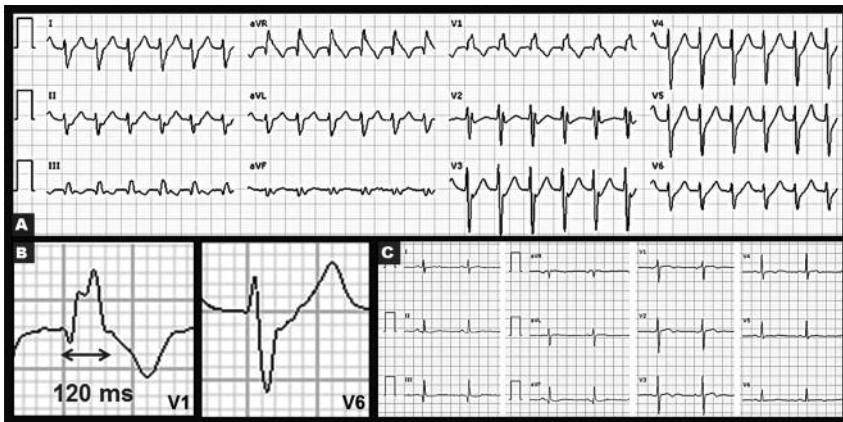


Figure 1. A: ECG during tachycardia episode; B: QRS complex in V1 and V6 (RBBB type); C: basal sinus rhythm of the patient.

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References

- 1 Brugada P, Brugada J, Mont L, Smeets J, Andries EW. A new approach to the differential diagnosis of a regular tachycardia with a wide QRS complex. *Circulation*. 1991;83:1649-59.
- 2 Vereckei A, Duray G, Szénási G, Altemose GT, Miller JM. Application of a new algorithm in the differential diagnosis of wide QRS complex tachycardia. *Eur Heart J*. 2007;28:589-600.
- 3 Tejera-Jurado LC, Nava S, Colín-Lizalde L, Márquez MF, Gómez-Flores J, González-Hermosillo JA, et al. Idiopathic ventricular tachycardia from the aortic sinus cusp. *Arch Cardiol Mex*. 2009;79:212-8.
- 4 Iturralde Torres P. Taquicardia ventricular idiopática. *Arc Cardiol Mex*. 2003;73(Supl. 1):S70-72.
- 5 Fernández-Armenta J, Calvo Galiano N, Penela D, García-Bolao I. Actualización en taquicardia ventricular. *Medicine*. 2013;11:2346-55.

Usefulness of bedside ultrasound for the diagnosis of pneumoperitoneum

Utilidad de la ecografía clínica en la detección del neumoperitoneo

Sir,

The usefulness of bedside ultrasonography in emergency medicine is unquestionable; in the United States it is firmly established in this

field. Its use in specific medical problems presents high diagnostic yield (eg. detection of free intra-peritoneal fluid and air) and faster diagnosis; in some cases, it directly contributes to decreased mortality¹. In the case presented here, medical history complemented with specific ultrasound findings led to early diagnosis.

A 62 year-old woman with hypertension and peptic ulcer since 20 years before visited the ED for epigastric pain during one week, with sudden worsening in the previous 24 hours, accompanied by nausea and some vomiting with traces of blood. Physical examination showed deterioration of her general condition, tachycardia, hypotension, and painful abdomen on palpation with abdominal guarding and absence of intestinal noise. During initial stabilization, bedside ultrasound showed free intra-peritoneal fluid in Morrison's pouch with enhanced peritoneal stripe (Figure 1A) and multiple parallel V-shaped hyperechoic

choic (bright) stripes (ring-down artefact) above the liver, suggesting the presence of free intra-peritoneal air (Figure 1B), and free peritoneal fluid.

Urgent abdominal computed tomography confirmed pneumoperitoneum in the vicinity of stomach, indicative of perforated hollow viscus, and abundant free fluid. On emergency laparoscopy, pyloric perforation was observed and resolved with simple suturing. Postoperative course was favorable.

Clinical ultrasound is becoming the initial imaging technique of choice in the evaluation of critical patients¹. In patients with abdominal pain, it can provide information on diseases that usually have a similar clinical presentation (gallstones, hydronephrosis, aneurysm of the abdominal aorta, etc.) and greatly complements the findings of physical examination².

Hollow viscus perforation is a surgical emergency requiring early treatment. Although standing chest X-ray is the standard method for the detection of pneumoperitoneum, in recent years numerous studies and case series have shown that ultrasonography has high sensitivity and specificity for the diagnosis of pneumoperitoneum, sometimes even higher than conventional radiography^{2,3}.

An example of this comes from a study by Chen et al., which showed that abdominal ultrasonography had higher sensitivity, specificity and positive predictive value than chest radiography in the standing and left lateral decubitus position in a sample of 132 patients⁴.

For this reason, it is essential that emergency physicians are familiar with ultrasound findings associa-

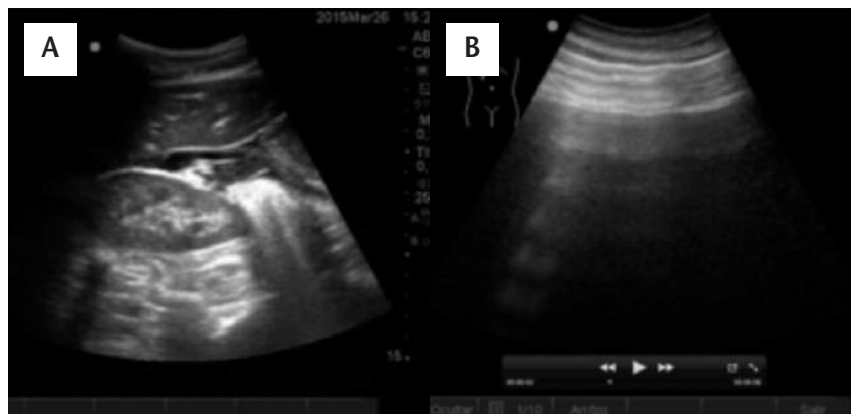


Figure 1. A: Morrison's pouch with abundant free fluid (anechoic). B: V-shaped hyperechoic parallel lines (ring-down artifact) in relation to free intra-peritoneal air.

ted with hollow viscus perforation, which are:

1. V-shaped or "ring down" artefact: these are artifacts of reverberation parallel to the transducer that occur when there is a difference of acoustic impedance between the soft tissue interface and gas, reflecting nearly 100% of the ultrasound beam^{3,5}.
2. Enhancement of the peritoneal stripe.
3. Free intra-peritoneal fluid, with or without artifacts due to gastric or intestinal contents, at various levels, with the hepato-renal recess being a common location^{3,4,6}.

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References

- 1 Lichtenstein D, Van Hooland S, Elbers P, Malbrain M. Ten good reasons to practice ultrasound in critical care. *Anaesthesiol Intensive Ther.* 2014;46:323-35.
- 2 Jones R. Recognition of pneumoperitoneum using bedside ultrasound in critically ill patients presenting with acute abdominal pain. *Am J Emerg Med.* 2007;25:838-41.
- 3 Karahan OI, Kurt A, Yikilmaz A, Khariman G. New method for the detection of intraperitoneal free air by sonography: scissors maneuver. *J Clin Ultrasound.* 2004;32:381-5.
- 4 Chen SC, Wang HP, Chen WJ, Lin FY, Hsu CY, Chang KJ, et al. Selective use of ultrasonography for the detection of pneumoperitoneum. *Acad Emerg Med.* 2002;9:643-5.
- 5 Hanbidge AE, Lynch D, Wilson SR. US of the peritoneum. *Radiographics* 2003;23:663-84.
- 6 Moriwaki Y, Sugiyama M, Toyoda H, Kosuge T, Arata S, Iwashita M, et al. Ultrasonography for the diagnosis of intraperitoneal free air in chest-abdominal-pelvic blunt trauma and critical acute abdominal pain. *Arch Surg.* 2009;144:137-41.

Importance of musculoskeletal ultrasound in the differential diagnosis of the inflamed knee.

Importancia de la ecografía musculoesquelética en el diagnóstico diferencial de la patología inflamatoria de rodilla

Sir,

We have read with interest the article by Montes de Algaba¹ on the use of musculoskeletal ultrasound (MSU) for the diagnosis of swollen knee. The authors emphasize the importance of this technique in the management of musculoskeletal disease in the emergency department (ED).

We share this view, although we believe that its importance is greater in processes where the differential diagnosis includes the possibility of intra-articular infection. The diagnostic possibilities are – from superficial to deep – as follows: cellulitis, patellar bursitis, infrarotula bursitis, arthritis (infectious, microcrystalline) and complicated popliteal cysts^{2,3}. Of all these, the correct identification of infectious arthritis has clinical implications which condition whether the patient requires hospitalization or not³⁻⁵.

A priori, semiotics is sufficient for proper discrimination between all possible inflammatory anterior knee processes. The diagnostic problem arises when there are clinical symptoms common to more than one of these diagnoses and one has to determine what is primary and what is secondary to inflammatory activity in the region⁶. An everyday example is the presence of swelling, functional limitation and extensive "orange peel" erythema; cellulitis can condition the presence of synovial effusion in both the bursae and the articular capsule itself. Conversely, an intra-articular inflammatory infectious process can produce intrabursal synovial effusion and, by contamination, cellulitis. In the back of the knee, the differential diagnosis includes two entities that manifest with pain radiating to the calf, inflammatory signs and functional impairment: deep vein thromboembolism (DVT) and acute complicated popliteal cyst.

Nearby synovitis may present a few days after cellulitis appears. Patellar bursa involvement is usually associated with anechoic distension of the deep infra-patellar bursa. The liberation of pro-inflammatory cytokines in neighboring tissue may even affect the joint synovium

with consequent synovial distention and little synovial proliferation. In infectious arthritis, synovial permeability increases and causes inflammatory signs typical of neighboring tissue. MSUS shows important capsular synovial proliferation acquiring a "digitiform" appearance associated with increased blood perfusion demonstrated by a regional increase in Doppler signal⁷ (Figures 1A and 1B). In infectious bursitis, such proliferation also occurs but without the tendency to portioning (Figure 1C). In synovitis in nearby tissue, the joint fluid is sterile unless fistulas occur with invasion of bacterial content.

The diagnosis of joint infections requires microbiological demonstration so it is imperative to obtain synovial fluid samples^{5,8} via healthy skin puncture. In this regard, MSUS can be used to guide the procedure^{7,9}.

Finally, MSUS facilitates differential diagnosis of DVT and complicated popliteal cysts by assessing permeability of the venous system through Doppler study or identification of cystic lesion between the internal gastrocnemio and semi-membranous muscles (Figure 1D and 1E). In patients whose joint infection includes these cysts, synovial proliferation is greater¹⁰ (Figure 1F).

Indeed, the use of MSUS improves clinical diagnostic capability, especially in emergency situations where semiotics is insufficient and allows the performance of diagnostic and therapeutic procedures. Therefore we agree that better training of emergency physicians is necessary in this field together with other previously demonstrated applications of emergency ultrasound.

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References

- 1 Algaba-Montes M, Oviedo-García AA. Utilidad de la ecografía en urgencias ante un

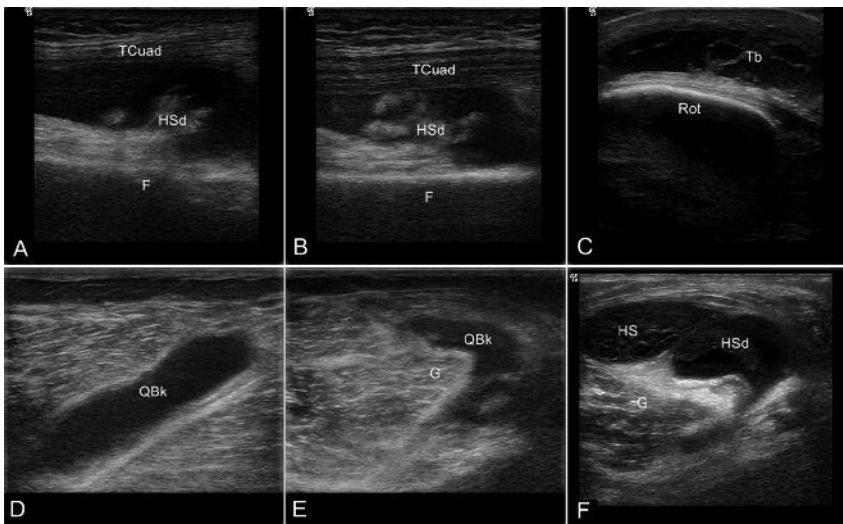


Figure 1. A and B: longitudinal slice of the subquadriceps recess under the tendon quadriceps (TCuad) where surface digitiform synovial hyperplasia (HSd) is observed at the cortex of the femur (F) in two patients with septic arthritis of the knee. C: transverse slice of the knee over the patella (Rot) in which the patellar bursa occupied by anechoic content and isoechoic content and fibrin (Tb) in a patient with infectious patellar bursitis. D: popliteal cyst or Baker's cyst (QBk) in longitudinal image with posterior access of the knee. E: Cross-sectional slice of the same knee in which the medial cyst wall is constituted by the fibers of the internal gastrocnemio. F: Cross section of a popliteal cyst in a patient with infectious arthritis with synovial hypertrophy (HS) and digitiform proliferation (HSs).

paciente con tumefacción de la rodilla. *Emergencias*. 2015;27:67.

- 2 Meenagh G, Iagnocco A, Filippucci E, Riente L, Delle Sedie A, Bombardieri S, et al. Ultrasound imaging for the rheumatologist IV. *Ultrasonography of the knee*. *Clin Exp Rheumatol*. 2006;24:357-60.
- 3 Mnif J, Khannous M, Keskes H, Louati N, Damak J, Kechaou MS. Ultrasonography in the diagnostic approach of septic arthritis. *Rev Chir Orthopédique Réparatrice Appar Mot*. 1997;83:148-55.
- 4 Tien YC, Chih HW, Lin GT, Hsien SH, Lin SY. Clinical application of ultrasonography for detection of septic arthritis in children. *Kaohsiung J Med Sci*. 1999;15:542-9.
- 5 Coakley G, Mathews C, Field M, Jones A, Kingsley G, Walker D, et al. BSR & BHP, BOA, RCGP and BSAC guidelines for management of the hot swollen joint in adults. *Rheumatol Oxf Engl*. 2006;45:1039-41.
- 6 Ser. *Manual SER de las enfermedades reumáticas*. Madrid: Ed. Médica Panamericana; 2008. pp. 508.
- 7 Henríquez-Camacho C, García-Casasola G, Guillén-Astete C, Losa J. Ultrasound for the diagnosis of infectious diseases: Approach to the patient at point of care and at secondary level. *J Infect*. 2015;(en prensa).
- 8 Mathews CJ, Coakley G. Septic arthritis: current diagnostic and therapeutic algorithm. *Curr Opin Rheumatol*. 2008;20:457-62.
- 9 Guillén Astete C, Blázquez Cañamero M, Velázquez Arce C. Utilidad de la guía ecográfica en tiempo real en el diagnóstico en urgencias de la artritis de tobillo. *Emergencias*. 2012;24:498-9.
- 10 Kim JS, Lim SH, Hong BY, Park SY. Ruptured popliteal cyst diagnosed by ultrasound before evaluation for deep vein thrombosis. *Ann Rehabil Med*. 2014;38:843-6.

Protocol for managing urticaria in the emergency department

Protocolo de actuación a la urticaria en urgencias

Sir,

Urticaria is a very common disease that significantly affects the quality of life and is a common cause of emergency department (ED) visits¹. The prevalence of lifetime acute urticaria is approximately 20% and chronic urticaria is estimated at 0.5-1%^{2,3}. Recently published European guidelines have changed the concept, the diagnostic approach and therapeutic strategy for this disease. Today we have new and very effective treatment for chronic urticaria². We believe these advances should be reflected in the management of urticaria in the ED, and that is why we have developed a protocol for use in the ED and for referral to the department of dermatology (Figure 1).

Urticaria is the appearance of hives and/or angioedema after the release of histamine and other mediators by mast cells. The clinical

pictures in ED that may simulate urticaria and must be ruled out due to their potential severity and different management are: anaphylaxis, angioedema mediated by bradykinin and urticarial vasculitis. The general symptoms, background and personal/family life of the elementary lesions and their duration allow making the differential diagnosis⁴.

Under the new clinical guidelines, the treatment of choice is new generation antihistamines, and the use of sedating antihistamines are not recommended due to their side effects. So, we consider ED physicians should start treatment with these fast-acting new-generation oral antihistamines and avoid using intramuscular sedating antihistamines. Also, it has been shown that up to 4 doses of new-generation antihistamines can be safely applied, suggest that ED patients with uncontrolled acute or chronic urticaria, the licensed doses can and should be increased^{2,5}.

The use of corticosteroids should be reserved for very extensive or severely symptomatic cases where angioedema is the main manifestation, and always in combination with antihistamines. Finally, we have set up direct referral to the hospital dermatology department for refractory cases for better diagnostic approach and therapy with the new drugs available.

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The authors declare no conflict of interest in relation to this article.

References

- 1 Martínez-Martínez ML, Escario-Travesedo E, Rodríguez-Vázquez M, Azaña-Defez JM, Martín de Hijas-Santos MC, Juan-Pérez-García L. Consultas dermatológicas en el Servicio de Urgencias: situación previa a la instauración de guardias de la especialidad. *Actas Dermosifiliogr*. 2011;102:39-47.
- 2 Zuberbier T, Aberer W, Asero R, Bindslev-Jensen C, Brzoza Z, Canonica GW, et al. The EAACI/GA(2)LEN/EDF/WAO Guideline for the definition, classification, diagnosis, and management of urticaria: the 2013 revision and update. *Allergy*. 2014;69:868-87.

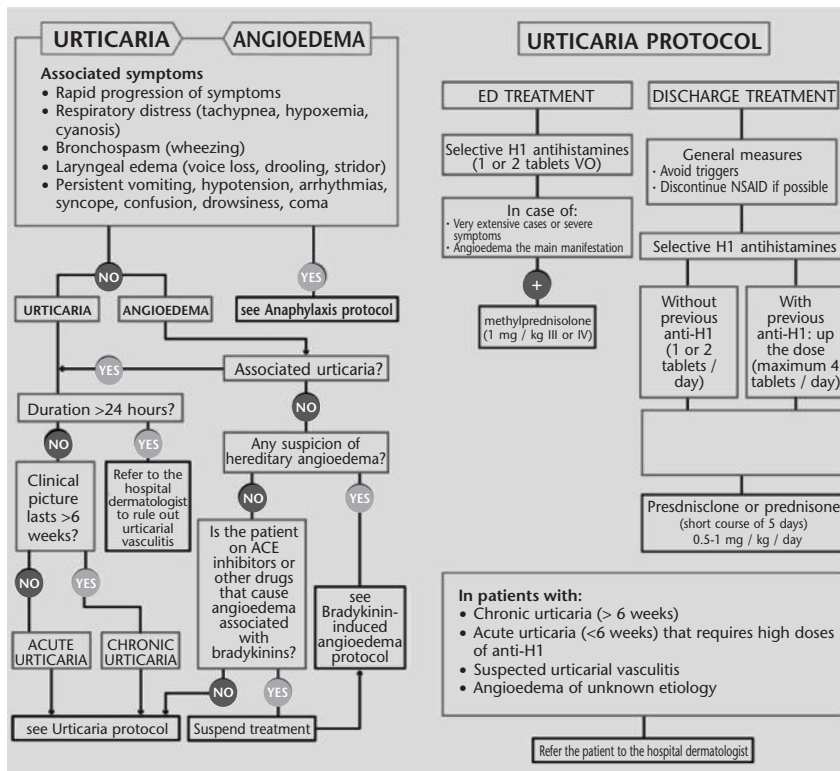


Figure 1. Protocol for managing urticaria in the emergency therapy.

- Curto-Barredo L, Silvestre JF, Giménez-Arnau AM. Actualización en el tratamiento de la urticaria crónica. *Actas Dermosifiliogr.* 2014;105:469-82.
- Máspero J, Cabrera H, Arduoso L, De Gennaro M, Fernandez Bussy R, Galimany J, et al. Guía argentina de urticaria y angioedema. *Medicina (B Aires).* 2014;74(Supl 1):1-53.
- Sánchez-Borges M, Asero R, Ansotegui IJ, Baiardini I, Bernstein JA, Canonica GW, et al. Diagnosis and treatment of urticaria and angioedema: a worldwide perspective. *World Allergy Organ J.* 2012;5:125-47.

Usefulness of emergency ultrasound using the Rapid Ultrasound in Shock (RUSH) protocol

Utilidad de la ecografía en urgencias: el protocolo RUSH

Sir,

A 22 year-old North African man visited the emergency department for fever during 24 hours. On arrival he nervous, sweaty, with poor general condition, fever (39 ° C), tachypnea, tachycardia, hypotensive (PA 80/40 mmHg), and ambient O2 saturation of 90%. Supportive measures and empirical antibiotic therapy were initiated. At the same time the emergency physician in charge of the case performed ultrasonography using the RUSH (Rapid Ultrasound in Shock) protocol¹, which showed pericardial effusion

with signs of serious cardiac tamponade, so during the same procedure pericardiocentesis was performed, yielding 130cc of purulent fluid. Microbiological study showed abundant gram negative diplococci, later identified as a meningococcal Group C *Neisseria meningitidis*. After pericardi-

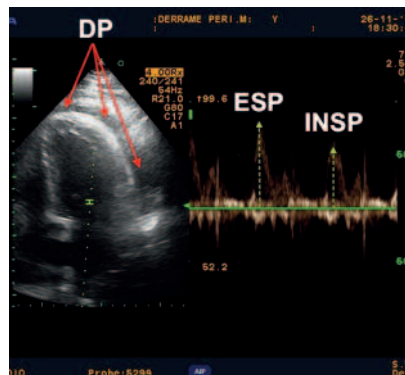


Figure 1. Analysis of mitral flow by pulsed Doppler, showing pericardial effusion in the left image (DP and red arrows) together with the change in transmitral flow with breathing (right), present when hemodynamic compromise exists. Actually this is the pathophysiology of the "paradoxical pulse" in which flow through the mitral valve increases during expiration (ESP) and decreases during inspiration (INSP).

centesis the patient improved hemodynamically, with normal blood pressure, and stabilized clinically.

Meningococcal sepsis is a severe process, with high mortality, caused by the bacterium *Neisseria meningitidis*. Serogroups B and C are responsible for most cases in Spain, but the introduction in the vaccine calendar of conjugate vaccine against meningococcus serogroup C (MenC) in the year 2000 has reduced the incidence of cases serogroup C greatly. The patient, being of North African origin, had not been vaccinated. In this case it was echocardiography which helped resolve the picture quickly and accurately. Applying the RUSH objective, the patient was not only septic, but also suffered cardiac tamponade, and chest tube placement quickly identified the microorganism responsible.

Ultrasound is a useful, fast technique with no adverse effects², and is now considered necessary in clinical practice^{3,4}. This letter is not intended to discuss the indications of this technique on a scheduled basis, which requires high professional qualifications, but we do believe in the usefulness of having emergency physicians qualified and trained in emergency ultrasoundonography, which allows a more accurate diagnosis⁵ and early effective treatment when required. Therefore, we believe educational programs and training, accredited and endorsed by our scientific societies, should be created for all emergency physicians to be properly trained in this technique.

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References

- Perera P, Mailhot T, Riley D, Mandavia D. The RUSH exam: Rapid Ultrasound in shock in the evaluation of the critically ill. *Emerg Med Clin North Am.* 2010;28:29-56.
- ACEP Policy Statement: ACEP Emergency Ultrasound Guidelines, 2008. *Ann Emerg Med.* 2009;53:550-70.
- Nogué Bou R. La ecografía en medicina de

urgencias: una herramienta al alcance de los urólogos. *Emergencias*. 2008;20:75-7.

4 Oviedo-García A, Algaba-Montes M, Jaloud-Saavedra E, Fernández-Valverde G. Pericarditis lúpica: a propósito de un caso. *SEMERGEN*. 2009;35:341-4.

5 Durston W, Carl ML, Guerra W. Patient satisfaction and diagnostic accuracy with ultrasound by emergency physicians. *Am J Emerg Med*. 1999;17:642-6.

Ocular ultrasound, new to the diagnostic arsenal in emergency medicine

La ecografía ocular, una nueva arma diagnóstica en urgencias

Sir,

Retinal detachment (RD) occurs when the neurosensory retina separates from the pigmentary epithelium and the underlying choroid¹. It can be rhegmatogenous, most frequently caused by a tear in the retina (rhegma: Greek for tear); or non-rhegmatogenous, in which there is leakage or exudation beneath the retina (exudative RD) or vitreous traction pulling on the retina (tractional RD). Rhegmatogenous RD is usually the result of vitreous detachment, more common in subjects aged 50-75 years¹. Predisposing factors include myopia and palisade degeneration of the retina. Retinal traction causes photopsias or flashing lights, which can last for a few seconds, associated with eye movement. These data should alert emergency physicians (EPs) to the possibility of RD. Without treatment, DR may progress and involve the entire retina, leading to loss of vision in the affected eye²,

hence the importance of rapid diagnosis.

We report the case of a 62 year-old man, with hypertension and well controlled diabetes, who reported seeing a "wide floating web" with flashing lights in the right eye, hindering vision. On ocular ultrasound, the attending EP observed an echogenic line compatible with RD (Figure 1). The man was referred immediately to the ophthalmology department, and was treated with laser photocoagulation; the floaters resolved and visual acuity was intact, allowing normal daily activity, thus avoiding vitrectomy and surgical repositioning of the retina.

Ultrasound has become a vital tool in the ED in recent years³. Since its inception decades ago, the use of ultrasound in emergency medicine has increased progressively, allowing EPs to manage even life threatening situations, perform ultrasound-guided techniques, and optimize diagnosis and treatment in urgent situations. We believe it important that EPs acquire new skills^{4,5} such as multipurpose ultrasound, associating clinical and sonographic information in the same hands, to increase diagnostic efficacy⁶.

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References

- 1 D'Amico DJ. Clinical practice. Primary retinal detachment. *N Engl J Med*. 2008;359:2346.
- 2 Hollands H, Johnson D, Brox AC, Almeida D, Simel DL, Sharma S. Acute-onset floaters and flashes: is this patient at risk for retinal detachment? *JAMA*. 2009;302:2243.
- 3 Nogué Bou R. La ecografía en medicina de urgencias: una herramienta al alcance de los urólogos. *Emergencias*. 2008;20:75-7.
- 4 ACEP Policy Statement: ACEP Emergency Ultrasound Guidelines, 2008. *Ann Emerg Med*. 2009;53:550-70.
- 5 Oviedo-García A, Algaba-Montes M, Jaloud-Saavedra E, Fernández-Valverde G. Pericarditis lúpica: a propósito de un caso. *SEMERGEN*. 2009;35:341-4.
- 6 Durston W, Carl ML, Guerra W. Patient satisfaction and diagnostic accuracy with ultrasound by emergency physicians. *Am J Emerg Med*. 1999;17:642-6.

Ultrasound and defibrillator gels: look-alike products on the point of causing adverse events

Gel de ultrasonidos y gel para desfibrilación. A propósito de un cuasi evento adverso del tipo look-alike

Sir:

We have recently experienced an incident in our emergency department (ED) which seems worthy of mention. This was a quasi adverse event regarding the use of gels for ultrasound (US) and cardioversion / electrical defibrillation (DF). The recent introduction of emergency US in our ED, in line with the ecoSEMES guidelines regarding the need for this in emergency procedures, means that US gel now forms part of the equipment available. Our ED safety commission detected that DF and US gels were being used arbitrarily for either procedure: ultrasound and cardioversion / defibrillation. After a root cause analysis, two most plausible causes were identified: 1) the look-alike containers of the two gels (Figure 1) and 2) probable ignorance of the fact that each gel has a specific use.

US gel comprises carbopol and water. The water represents more than 90% of the composition, leaving virtually no trace after use. Carbopol is a mixture of soluble resins; it has excellent properties of suspension and thickening, and is widely used in the preparation of gels. It is optimized for acoustic impedance, while DF gel is designed to minimize

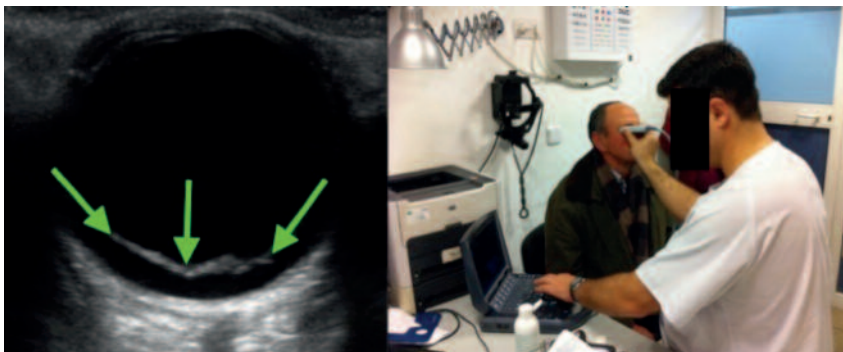


Figure 1. Left: ultrasound image of the right eye, showing an echogenic line (white), marked with green arrows, on the posterior eyeball, compatible with a detached retina (left). Right: Emergency physician performing ultrasound of the patient's right eye, who remains seated on suspicion of retinal detachment, as the decubitus position could increase the size of the detachment.

electrical impedance. Both gels are aqueous solutions, capable of transmitting sound or electricity respectively.

US gel has low conductance and should not be used for cardioversion / defibrillation, as in fact is specified in the 2005 European Resuscitation Council (ERC) recommendations¹, as well as being a poor electrical conductor, so it could cause burns to the patient chest if hydro-alcohol solutions are used. Specifically, the recommendation is "Do not use gels or pastes with low electrical conductance (eg. ultrasound gel)". Moreover, DF gel, with high conductance, is not valid for US use. As well as causing crystals in the quartz tube to break, the quality of the image obtained is of poorer quality.

The main reason for the confusion in this case was probably the look-alike containers in format and color, as seen in Figure 1, compounded by the fact they were situated near each other in the store-room and even on the cardiac arrest trolley. This look-alike phenomenon is more common in relation to drugs².

The solutions adopted by the safety commission were to relocate the two gels, and replace one of them with another of different appearance. It also communicated the incident to professionals, using at least two ED information media, warning them of possible future incidents and asking them to check what type of gel was



Figure 1. Look-alike defibrillation gel and ultrasound gel.

to be used before each procedure. Interestingly, when other hospital departments using US were warned about this circumstance, they began to explain the low-resolution images obtained "lately".

We conclude by recommending that ED training courses in emergency US, and emergency medicine manuals and textbooks on this topic,

should contain a warning about the correct use of gels, and this apparently "superficial" issue should also be made known to all health professionals using US, to avoid possible adverse events

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References

- 1 Deakin CD, Nolan JP. Recomendaciones 2005 del European Resuscitation Council sobre Reanimación Cardiopulmonar. Sección 3. Tratamientos eléctricos: desfibriladores externos automáticos, desfibrilación, cardioversión y marcapasos. (Consultado 23 Julio 2015). Disponible en: <http://www.cercp.org/guias-y-documentos/guias/guias-2005/119-3-tratamientos-electricos-desfibriladores-externos-automaticos-desfibrilacion-cardioversion-y-marcapasos/file>.
- 2 Ciociano N, Bagnasco L. Look alike/sound alike drugs: a literature review on causes and solutions. *Int J Clin Pharm.* 2014;36:233-42.