

LETTERS TO THE EDITOR

Chest pain without electrocardiographic confirmation of a diagnosis: Should we prefer anatomical or functional evaluation?*Dolor torácico sin electrocardiograma diagnóstico: ¿qué es preferible la evaluación anatómica o la evaluación funcional?***To the editor:**

We congratulate Durán-Cambra *et al.*¹ for their work on the usefulness of ultrasensitive troponins and computerized coronary angiotomography (CCAT) for the rapid diagnosis of chest pain (CP) in the emergency department (ED) and we present some reflections.

In their clinical trial, they randomized patients treated in the ED for CP without diagnostic electrocardiogram to two diagnostic strategies: conventional strategy (fourth generation T troponin and conventional ergometry if troponin seriation was negative) or new strategy (high sensitivity T troponin and CCAT in case of negative troponin seriation). In both strategies, invasive coronary angiography was performed if troponins, CCAT or ergometry were positive. Although the sample size was not complete, it was found that the new strategy shortens the time to diagnosis and allows a greater percentage of angiographically significant lesions to be detected ($\geq 70\%$). Clinical follow-up was limited (only 3 months), but no clinical differences were observed between the two strategies.

The diagnostic strategy in CP continues to be controversial. On the one hand, European guidelines² already support the implementation of rapid diagnostic protocols using ultrasensitive troponins, in line with the study by Durán-Cambra *et al.*¹. However, the subsequent evaluation by CCAT deserves some considerations:

First, the functional significance of coronary stenosis. Isolated angiographic evaluation of significant stenosis ($\geq 70\%$) may be insufficient to evaluate functional repercussion, also in patients with acute coronary syndrome. There is evidence indicating that patients with acute coronary syndrome and coronary steno-

sis $\geq 70\%$ with negative pressure guide wire (not functionally significant), medically managed, present good long-term prognosis³. Expanding information on the use of pressure guide wires during coronary angiography would improve the comprehension of the study¹.

Second, with respect to ischemia detection tests (IDT), the addition of imaging techniques increases the sensitivity and specificity of IDT. In patients with CP, the use of IDT with imaging increases the diagnostic and prognostic capacity of the images^{2,4}. In the Durán-Cambra *et al.*¹ study, the use of conventional ergometry such as IDT may have reduced the detection of significant coronary disease in the conventional strategy arm.

Finally, we would like to comment on the anatomical evaluation versus functional evaluation. Anatomical evaluation with CCAT presents disadvantages compared to the functional evaluation by IDT with imaging, since CCAT has limitations in case of vascular calcification, elevated or irregular heart rate or in the evaluation of patients with previous surgical or percutaneous revascularization. Likewise, there has also been an increase in the performance of invasive coronary procedures in patients with CP undergoing CCAT, without this translating into an improvement in prognosis⁵. These are some of the reasons why European guidelines currently prefer functional evaluation over anatomical evaluation².

In conclusion, pure anatomical evaluation of coronary lesions using CCAT, by increasing coronary stenosis detection (functionally significant or not), could increase the performance of invasive coronary angiography and unnecessary revascularization. Therefore, more studies are needed to clarify the best diagnostic strategy in patients with CP without diagnostic electrocardiogram.

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Authors' reply**Respuesta del autor****To the Editor:**

We are grateful for the interest shown in our study recently published in *Emergencias*¹. We have read carefully the comments made about it and would like to respond with the following considerations.

Although the percentage of invasive coronary angiography was higher in the new strategy group (28% vs 13.3%), the likelihood of finding significant coronary lesions susceptible to be treated was also higher in this group (92, 9% vs 66.7%), so the new strategy had the advantage of avoiding unnecessary coronary angiography^{2,3}.

The highest rate of revascularization in patients guided by computerized coronary angiotomography (CCAT) was accompanied by better prognosis in a recent study, with a

mean follow-up of 18.7 months⁴. However, this beneficial effect could not be verified in our study, with a follow-up of 3 months, given the small number of events.

The use of a pressure guide could help in the selection of patients who could benefit from revascularization, especially in patients with borderline lesions (50-70%)⁵. In our case, no pressure guide was used. All cases that were revascularized had lesions greater than or equal to 70%. The study of myocardial perfusion by CCAT could provide useful information for the management of these patients, allowing functional reperfusion of the lesion detected⁶.

In our study, it was decided to compare the new strategy with the standard ergometer strategy because that is the one most widely used in emergency departments and is usually the initial diagnostic approach in most hospitals. However, there are studies that suggest that CCAT may have a greater capacity to diagnose coronary heart disease than ischemia imaging⁷. Regarding the limitations of CCAT mentioned, the exclusion criteria of our study included previous known coronary disease, since in this subgroup CCAT does not present its best diagnostic performance. Despite the above limitations, no CCAT was considered non-evaluable in our study.

In summary, a strategy for the evaluation of patients with chest pain of possible coronary origin with non-diagnostic ECG and high sensitivity normal troponin based on CCAT has been shown to be rapid and presents a high diagnostic yield. In addition, recent studies suggest that the management of these patients according to the information obtained from CCAT could provide a benefit in terms of their prognosis. In the presence of borderline coronary lesions, functional tests of ischemia detection can provide valuable information when deciding on the optimal management of these patients. In this regard, the incorporation of the perfusion study in the same CCAT could represent an interesting advance for the diagnosis of these patients.

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Venous bullet embolism

Embolismo venoso de un proyectil

To the Editor:

In Spain, firearm injuries kill approximately 300 people a year, according to the World Health Organization. The inclusion and vascular embolization of a projectile after penetrating trauma is an infrequent but serious phenomenon¹.

It is more common with small calibre (low speed) projectiles. Complications of embolization of a projectile include limb ischemia, sepsis, endocarditis, cardiac valvular incompetence, pulmonary embolism, stroke, and even death². A case is presented below.

A 34-year-old man was rushed to the emergency department after being shot by a low-speed, 9-mm calibre firearm, fired one meter away while sitting in a car. On arrival at the hospital, the patient was hemodynamically stable, with a Glasgow Coma Scale (GCS) score of 15; he had six penetrating wounds (three in the right hemithorax, one in the left iliac crest, one in the right gluteus and another on the left forearm). Thoracoabdominal computed tomography (CT) scan showed five subcutaneous projectiles and a projectile adjacent to the inferior vena cava that produced a metal artifact and made the exact location difficult to determine. In the presence of pneumoperitoneum, surgical intervention was decided. A small bowel perforation was identified and resected, the subcutaneous projectiles were removed, but the intra-abdominal projectile was not located, nor was any retroperitoneal alteration detected. Abdominal x-ray at 24 hours of surgery showed projectile migration. Abdominal CT scan showed the projectile proximal to the ostium of the right renal vein. A cavogram was performed confirming the intravascular location of the foreign body in the renal vein. Since the patient was asymptomatic, the projectile was not removed and a vena cava filter was placed, which was removed one month later after checking the stability of the projectile and correct right renal function. Three months later, the patient consulted for low back pain. Spinal X-ray showed a retrosternal projectile. An echocardiogram confirmed the location of the projectile in the right ventricle lumen. It was decided to remove the projectile using percutaneous endovascular techniques, without success. Currently the patient is pending cardiac surgery.

Embolization of a projectile should be suspected when serial imaging demonstrates its mobilization^{3,4}. Arterial embolism is more frequent and symptomatic. The embolism of a venous projectile can occur acutely, late (months or years after the injury) or during the endovascular/surgical treatment⁵. Removal of all arterial projectiles at the time of diagnosis is recommended, while venous projectiles have less defined management. It has been suggested that extraction be performed of symptomatic projectiles and mere observation of the asymptomatic ones⁴. Removal may be performed by percutaneous endovascular techniques or by open surgery. The inclusion and vascular embolization of a projectile is an infrequent event, so an individualized approach is required.

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Pylephlebitis: a serious complication of acute diverticulitis

Pileflebitis: una complicación grave de las diverticulitis agudas

Sr. Editor:

Pylephlebitis or septic thrombophlebitis of the portal vein is a serious infectious process that may appear as a complication of intra-abdominal sepsis of any etiology¹.

A 51-year-old male with a history of hypertension and uncomplicated acute diverticulitis in 2003 attended the ED for abdominal pain in the left iliac fossa and fever during 48 hours. Blood pressure was 110/80 mmHg, heart rate 92 beats per minute and temperature 38.6°C. On abdominal examination, there was pain and defence in the left iliac fossa. Urgent lab tests showed leucocytosis with 12,000 leukocytes/ μ l (93% neutrophils), 249 mg/dl PCR, pH 7.42 and preserved renal function. Abdominal computed tomography showed sigma diverticula with few inflammatory phenomena of the neighbouring mesentery, a small co-

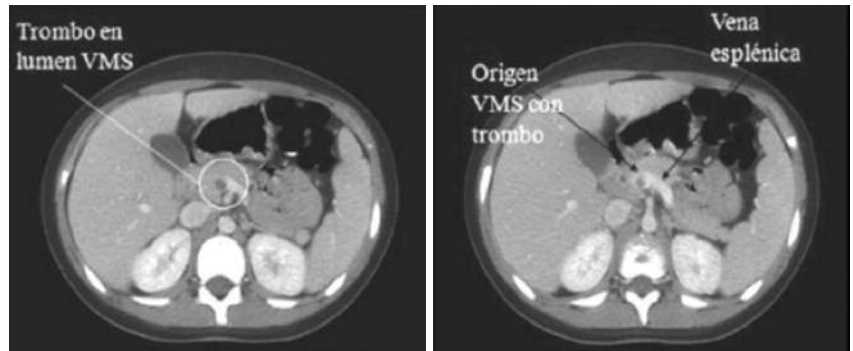


Figure 1. Abdominal computed tomography showing the presence of a thrombus in the superior mesenteric vein (SMV) (arrows).

llection of extraluminal gas, and a small fistulous tract that ran from one of the sigma diverticula anterior to the retroperitoneal vessels. Empirical intravenous antibiotic treatment with imipenem 1 g ev/8 hours was started. On the third day of admission, in the presence of persistent fever and abdominal pain associated with worsening lab test results, a new control tomography was performed (Figure 1), revealing the presence of a thrombus in the superior mesenteric, splenic, spleno-portal axes, main portal and branches. There was a small pneumoperitoneum and an image compatible with a peripheral triangular infarct of the spleen. With the diagnosis of acute diverticulitis complicated with pylephlebitis, urgent surgery was decided. A Hartmann intervention was performed. In the peritoneal fluid, ampicillin and piperacillin resistant *E. coli* were isolated. The patient was discharged ten days after the procedure.

In the present case, it was not possible to predict the development of pylephlebitis: the patient had no associated comorbidity and the analytical and imaging data did not suggest a poor prognosis. Pylephlebitis can complicate any abdominal or pelvic infection that occurs in the region drained by the portal venous system, especially diverticulitis and, less frequently, appendicitis, cholangitis, necrotizing pancreatitis or inflammatory bowel disease¹⁻⁵. The most commonly isolated microorganisms are *Bacteroides fragilis* and *E. coli*⁶. It can have a diverse onset and evolution, from an asymptomatic patient to septic shock. Fever and abdominal pain are the most frequent signs^{1,2,4}. The diagnosis requires the demonstration of a portal venous thrombosis or the existence of gas in the portal system accompanied by bacteremia in a febrile patient². Since it is a rare entity, the diagnosis is often delayed, which

worsens the prognosis². Management is based on broad-spectrum antibiotics¹⁻³. Surgery is indicated in selected cases to resolve the infectious problem that causes the disease^{1,2}. Cases of drainage placement in the portal vein have reported good results². Nevertheless, mortality is high (11-32%)². Antithrombotic treatment is considered adequate in patients with hypercoagulability syndrome^{2,4}.

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On the case letter "Pulmonary embolism with in-transit thrombus and foramen ovale: a source of fatal paradoxical embolism"

*Comentarios sobre el artículo:
"Embolia de pulmón con trombo en
tránsito y foramen oval permeable:
una fuente de embolismo paradójico
mortal"*

To the Editor:

Rosa *et al.*¹ present a patient with acute pulmonary embolism (PE) and risk of early-intermediate death, defined in the imaging tests (echocardiography or computed tomography) by signs of right ventricular dysfunction and in laboratory tests by elevation of cardiac biomarkers (troponins or natriuretic peptides)². The case is complicated by a thrombus in transit (TT) that reaches the right atrium from the inferior vena cava and in the presence of a patent oval foramen (POF).

In acute intermediate-high-risk PE, systemic thrombolysis is not routinely recommended as its benefits are counteracted by the high risk of haemorrhagic stroke or major extracranial haemorrhage. It is considered "rescue" if clinical signs of hemodynamic decompensation appear². However, the case presented is more complex because of TT and FOP and the high mortality rate, risk of recurrent PE and associated paradoxical embolism. For all this, more aggressive emergent treatment is indicated^{3,4}. To date, there is no consensus on the best therapeutic option due to the scarcity of studies, and with important methodological limitations, on this very rare entity^{3,5}.

Anticoagulation alone is potentially dangerous in the presence of a thrombus floating in the right hemocardium and may embolize a severely compromised pulmonary circulation⁴, and in this case also the systemic circulation due to the presence of POF⁵. Surgical thromboembolism allows simultaneous repair of POF⁴. In addition, the study by Myers *et al.*⁵ shows a significant reduction in systemic mortality or embolism versus anticoagulation or thrombolysis. However, they recognize the methodological limitations and point out that the thrombolysis

group was heterogeneous, since different thrombolytic drugs were used and at different doses without being able to perform a subgroup analysis because of the small sample size. As for thrombolysis, the benefit of rapid administration and simultaneous treatment of venous, cardiac, pulmonary and systemic thrombi must be weighed against the risk of systemic embolization by fragmentation of the thrombus described in some cases^{3,5}.

In view of the indication for emergent surgical treatment, the use of unfractionated heparin (due to its short half-life, ease of monitoring and rapid reversal of effect by protamine) is more indicated than enoxaparin. A 5-day delay in the implementation of either treatment (surgical thromboemboloplasty and thrombolysis) seems to be unjustified, since both are more effective than heparin alone^{3,4} and because such delay is associated with higher lethality³. If there is no possibility of emergent surgery, systemic thrombolysis should have been used, despite increasing the risk of bleeding, since its use does not constitute an absolute contraindication for surgical thromboembolectomy^{2,3}.

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Pseudohypoglycemia due to acrocyanosis

Pseudohipoglucemia causada por acrocianosis

To the Editor:

The determination of capillary glycemia by means of a glucometer is a common technique in the emergency department for the evaluation of the diabetic patient or one with altered consciousness. The fingers of the hand are the main place of blood sampling, but this can generate errors of measurement in some cases, distort the diagnosis and delay the appropriate treatment. We present a case of capillary glycaemia monitoring error related to digital acrocyanosis.

A 91-year-old woman was found by members of the fire brigade and an advanced life support unit on the floor of her home. The last contact had been five days earlier. At home the patient was stuporous, dehydrated, with sphincter relaxation, pressure ulcers and acrocyanosis. The heart rate was 86 bpm, blood pressure 150/80 mmHg, temperature 34.5°C, and finger capillary glycemia was 12 mg/dl. A venous line was channelled and 30 ml of 40% glucose and 500 ml of 5% glucose serum were administered without achieving normoglycemia or full recovery of consciousness. In the hospital, her medical history was accessed through electronic medical records, among which we found: hypertension, hyperlipidaemia, type 2 diabetes without treatment, preserved superior functions and autonomy for activities of daily living. During her stay in the ED, a repeated discordance between capillary glycaemia, 25 mg/dl and 41 mg/dl, and venous glycaemia, 312 mg/dl and 158 mg/dl, was observed, suggesting a failure in the technique of capillary glycaemia determination. Simultaneously repeating capillary glycemia on a finger (cyanotic) and on the earlobe (normal coloured) revealed a low value (<30 mg/dl) in the finger, and 191 mg/dl in the lobe of the ear, and hypoglycemia was ruled out as the cause of the decreased level of consciousness. Cerebral axial tomography showed ischemic infarction with left and frontal parietotemporal haemorrhagic transformation.

It has been postulated that pseudohypoglycemia secondary to acrocyanosis is due to a defect in microcirculation that causes a local increase

of glucose consumption¹. This mechanism can also produce pseudohypoglycemia in patients with Raynaud's disease² or peripheral vascular disease³ and must be differentiated from pseudohypoglycemia secondary to increased glycolysis in vitro, as can occur in extreme leukocytosis⁴. In conclusion, it is not advisable to perform digital capillary glycemia determination in the presence of distal acrocyanosis. In this situation, another extraction zone should be found.

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Acute pancreatitis secondary to primary hyperparathyroidism

Pancreatitis aguda secundaria a hiperparatiroidismo primario

To the Editor:

Acute pancreatitis is a clinical entity with multiple etiologies, whe-

re alcohol consumption and biliary lithiasis account for 80-90% of cases. Other less common causes are neoplastic obstructions, ischemic processes, autoimmune diseases and metabolic alterations, among which are hypertriglyceridemia and hypercalcemia¹. We describe the case of a patient who presented with acute pancreatitis with hypercalcemia secondary to an unknown primary hyperparathyroidism.

This was a 30-year-old man with a history of recurrent nephrolithiasis. He was not on any treatment and had no toxic habits. He visited the ED for periumbilical abdominal pain, continuous, irradiating to the back accompanied by vomiting of alimentary content since 12 hours before. Physical examination showed pain on palpation of the epigastric surface, with no signs of peritoneal irritation. On ED arrival, he had leukocytosis ($16.5 \times 10^3/\text{mm}^3$) and neutrophilia (79%), with normal biochemistry except amylase 2,775 IU/l, lipase 1,772 IU/l and calcemia 12 mg/dl (normal range 8.2-10.4 mg/dl). Hepatic enzymes and bilirubin were normal. With the diagnosis of acute pancreatitis, abdominal ultrasound was performed, which was normal, no gallstone lithiasis was observed, and abdominal computed tomography showed a pancreatic gland of normal size and morphology with homogeneous enhancement, with punctiform calcifications in the head and body of the pancreas. There was no intrahepatic dilatation. Due to the persistence of hypercalcemia, plasma calcium and intact parathormone (PTHrP) were requested, with values of 11.9 mg/dl and 110 pg/ml, respectively (normal values up to 65 pg/ml). The diagnosis was hyperparathyroidism. A localization study was performed using Tc99m-Sestamibi scintigraphy, which showed uptake compatible with left inferior parathyroid adenoma. The patient evolved favourably from pancreatitis and days later surgical excision of the parathyroid glands was performed. The pathological anatomy was diagnosed as parathyroid adenoma. The patient has not had any episodes of acute pancreatitis since.

Hypercalcemia secondary to primary hyperparathyroidism is an uncommon cause of acute pancreatitis.

Patients with hypercalcemia secondary to this pathology are 10 times more likely than the general population to present acute pancreatitis². The pathophysiology of the process is not well known. It is postulated that hypercalcemia causes an increase of calcium concentration in the pancreatic fluid, which favors trypsinogen transformation into trypsin³. In recent years, some authors have advocated a genetic substrate, detecting mutations in the PINK1 (serine protease inhibitor Kazal type I) and CFTR (cystic fibrosis transmembrane conductance regulator) genes in patients with primary hyperparathyroidism who developed acute pancreatitis. This case reminds us that hypercalcemia in the context of acute pancreatitis should lead to suspicion of hyperopia.

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