



Fig. 2. CT oblique sagittal reconstruction: abdominal fluid collection in an anterior site (star) communicating with left pleural effusion (arrow) in a posterior site.

pancreatitis. The case described here was a pancreatic-pleural fistula. Computed tomography,⁶ magnetic resonance imaging (MRI), MRI cholangiopancreatography, and endoscopic retrograde cholangiopancreatography are used for diagnosis. The latter 2 procedures help locate the disruption more precisely. Treatment involves the suspension of enteral diet, the administration of somatostatin or octreotide, and the endoscopic placement of a pancreatic stent or suturing of the disruption in open surgery. Conservative treatment is another option,⁷ and was the approach selected for our patient, consisting mainly of drainage of pleural fluid. The clinical outcome was favorable. We decided to offer conservative treatment due to the patient's good initial response after placement of the last pleural drainage in our center. This was also the reason why we did not request an MRI

cholangiopancreatography during the patient's stay in intensive care.

Although this complication is rare, it should be borne in mind due to its clinical impact, especially in patients with chronic pancreatitis and massive left pleural effusion.

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Fernando Arméstar,^a Esther Fernández,^b Maria de la Torre,^c Ignacio Guasch,^d Francisco Espín^e

^a Servicio de Medicina Intensiva, Hospital Universitario Germans Trias i Pujol, Badalona, Barcelona, Spain

^b Servicio de Cirugía Torácica, Hospital Universitario Germans Trias i Pujol, Badalona, Barcelona, Spain

^c Servicio de Medicina Intensiva, Consorcio Sanitario del Maresme, Mataró, Barcelona, Spain

^d Servicio de Radiología, Hospital Universitario Germans Trias i Pujol, Badalona, Barcelona, Spain

^e Servicio de Cirugía General, Hospital Universitario Germans Trias i Pujol, Badalona, Barcelona, Spain

Corresponding author.

E-mail address: farrestar.germanstrias@gencat.cat (F. Arméstar).

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Hemoglobin Rothschild: A rare cause of low arterial oxygen saturation[☆]



Una causa infrecuente de saturación arterial de oxígeno baja: hemoglobinopatía de Rothschild

To the Editor,

The pulse oximeter, a non-invasive method of measuring oxygen transported by hemoglobin inside the blood vessels, is one of the most widely used devices in medical practice. It emits light with 2 wavelengths of 660 nm (red) and 940 nm (infrared) that are characteristic of oxyhemoglobin and reduced hemoglobin, respectively, and calculates the percentage of oxyhemoglobins by comparing the absorption of light during the pulsatile wave with the base-

line level.¹ Correlation between oxygen saturation and the partial pressure of oxygen in arterial blood is determined by the oxyhemoglobin dissociation curve.

In clinical practice, a level of oxygen saturation well below the expected limits² means that many etiologies must be ruled out, some of which are quite rare. We report a case of hemoglobinopathy with altered oxygen affinity detected by pulse oximetry.

Our patient was a 53-year-old man, farmer by profession, and former smoker who had started smoking at the age of 13, and had quit 10 years previously; pack-year index: 15; allergic to penicillins and intolerant to tramadol; congenital ventricular septal defect, with no current impact on health. Family disease history included mother with chronic heart disease and father who died of non-Hodgkin's lymphoma. He has a healthy sister.

He was referred to our clinic from primary care for a 6-month history of dyspnea on intense exertion, and no other respiratory symptoms.

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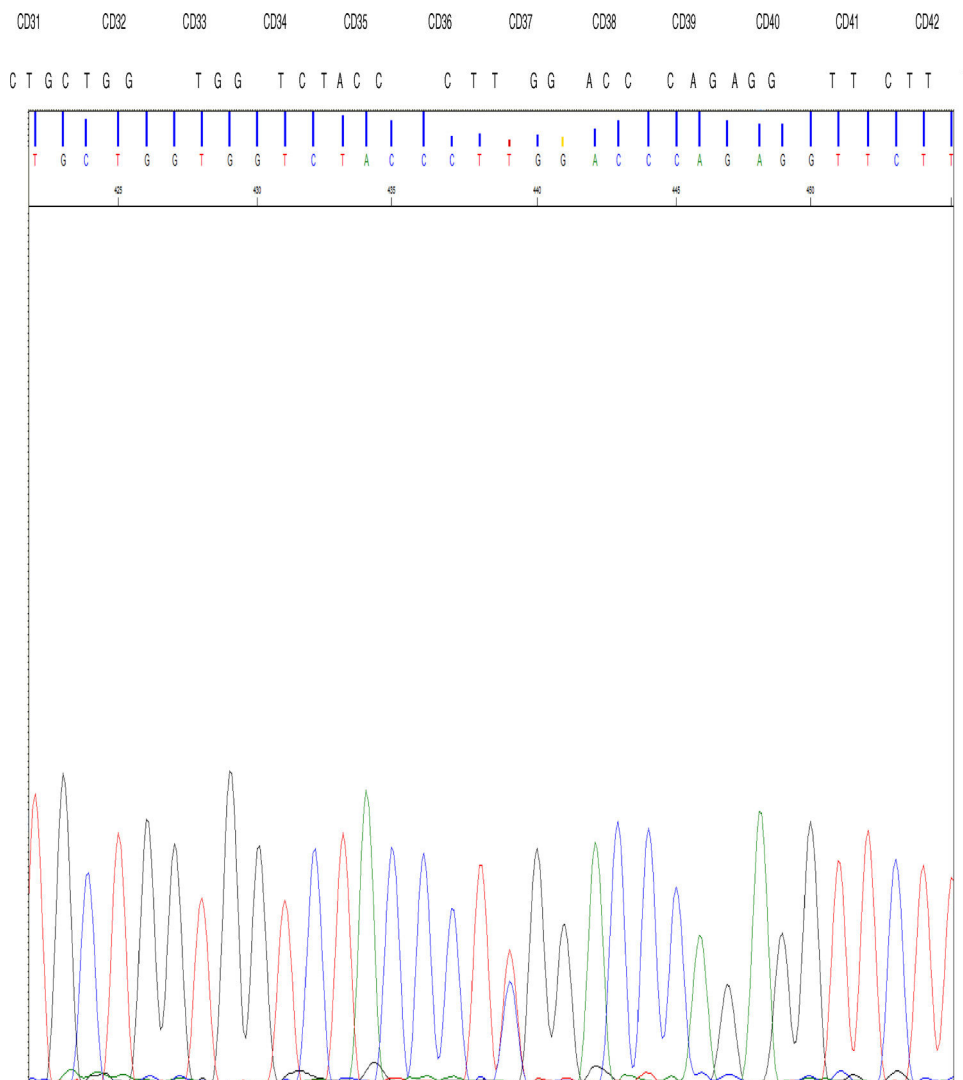


Fig. 1. The TGG>CGG mutation at codon 37 in the 2nd exon of the β gene in an allele that determines the replacement of amino acid tryptophan by arginine at position 3 of the C helix of the chain encoded by the mutated allele.

Physical examination showed no relevant findings, no cyanosis, no tachypnea, no other signs of chronic respiratory failure, but basal oxygen saturation was 76%–77%, surprisingly low and surprisingly well tolerated, confirmed by different devices. Blood gas analysis was carried out in which partial pressure of oxygen in arterial blood was below normal, confirming hypoxemia with oxygen saturation of 76%, with a partial pressure of oxygen in arterial blood of 41 mmHg. Chest radiograph was normal. Spirometry was also performed, and values were normal in all cases (FVC: 5580–117%, FEV1: 4470–123%, FEV1/FVC: 80%, MEF: 25–75%: 3340–100%).

To rule out the most common causes of hypoxemia, we performed a computed tomography of the chest which showed only a persistent left superior vena cava, and hypoplastic brachiocephalic trunk, thus excluding, among other problems, thromboembolic disease at a radiological level. Diffusion testing was also performed, which was normal.

Given the patient's cardiological history, we requested a specific reassessment to rule out any kind of arteriovenous shunt: transthoracic and transesophageal echocardiograms and a bubble study were performed, ruling out any active ventricular septal defect. Cardiac catheterization was also performed, showing normal left ventricular ejection fraction, and ruling out changes in

coronary artery lumens and in the pulmonary and systemic circulation.

Clinical laboratory tests were performed, including full blood count, biochemistry, kidney function, liver profile, thyroid markers, etc.), showing no changes.

Finally, after contacting the hematology department, we performed hemoglobin electrophoresis: the patient had hemoglobin with abnormal electrophoretic mobility of up to 35%. P50 was also calculated, which in our patient was 34.5, consistent with hemoglobinopathy with altered oxygen affinity. Given this suspicion, we requested the Hospital San Carlos in Madrid to identify the anomalous hemoglobin. After DNA sequencing, the patient was determined to have hemoglobin Rothschild.

The DNA study identified the TGG>CGG mutation at codon 37 in the 2nd exon of the gene β in the allele that determines the replacement of amino acid tryptophan by arginine at position 3 of the C helix of the chain β encoded by the mutated allele.

High performance liquid chromatography was also performed, which showed abnormal hemoglobin in the fraction corresponding to hemoglobin D; after new sampling for arterial (p50 value of 34.5) and venous blood gases, we concluded that this was

hemoglobin Rothschild [β 37 (C3) Asp>Tyr; HBB: c.112T>C] (Fig. 1).

Hemoglobin consists of a tetramer of polypeptide chains of globins, a pair of α chains, 141 amino acids in length, and a pair of β chains of 146 amino acids.³ The main hemoglobin in adults is HbA, which has an α 2 β 2 structure. Each heme fraction can bind to a single molecule of oxygen, so that each molecule can carry up to 4 molecules of oxygen. The key properties that are altered in hemoglobin diseases are solubility and the reversible union of oxygen, which depends particularly on hydrophilic amino acids, hydrophobic amino acids that line the heme pocket, a histidine in the F helix, and the amino acids that form the contact surfaces of α 1 β 1 and α 1 β 2. The alteration that modifies oxygen affinity is located in these regions.³

Hemoglobin Rothschild is a mutation of the hemoglobin β chain, where it substitutes the tryptophan residue at position β 37(C3) with arginine. Tryptophan in B37 (C3) is a contact point at the α 1 β 2 and α 2 β 1 interfaces, and the replacement of tryptophan by arginine leads to destabilization of the interfaces affected during oxygenation and deoxygenation: a deviation from normal oxygen levels is expected, but this deviation occurs only at the molecular level and has no apparent clinical manifestation in patients, who usually remain asymptomatic.^{4,5} It should be noted that the partial pressure at which the hemoglobin is half saturated is p50, HbA has a p50 of 25 ± 2 mmHg, whereas hemoglobin Rothschild [β 37(C3) RTP \rightarrow Erg] has a higher p50 due to its low affinity to oxygen.⁴⁻⁶

Altered oxygen saturation in our patient, determined by pulse oximeter, was the initial reason for performing this study. After identifying the cause of the problem to be hemoglobinopathy and explaining to the patient the limited clinical implications of this finding, he was able to minimize his problems and symptoms, which had been exaggerated by his knowledge of the abnormality and his fear of possible disease. We believe that, in patients presenting low oxygen saturations with no obvious cause and little clinical concordance, this type of hemoglobinopathy should be taken into consideration because despite its rarity, it can appear in routine practice.

In addition, to complete the family study and to identify other cases, pulse oximetry was used to identify our patient's sister and 2 nephews as carriers.

When a patient presents with low oxygen saturations with no apparent pathological cause to explain the hypoxia,^{4,5,7} we must bear in mind an oxygen affinity alteration⁷⁻⁹ of hemoglobin, since many of these conditions develop without symptoms⁵ and uncom-

mon diseases can be detected by measuring saturation using a pulse oximeter,^{10,11} as in the case which we report here.

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Luis Manuel González García,^a José María Hernández Pérez,^{b,*} María Tapia Torres,^c Paloma Ropero Gradilla^d

^a Centro de Salud de Breña Baja, Área de Salud de La Isla de La Palma, Breña Baja, Santa Cruz de Tenerife, Spain

^b Sección de Neumología, Hospital General de La Palma, Breña Alta, La Palma, Santa Cruz de Tenerife, Spain

^c Servicio de Hematología, Hospital General de La Palma, Breña Alta, La Palma, Santa Cruz de Tenerife, Spain

^d Servicio de Hematología y Hemoterapia, Hospital Clínico San Carlos, Madrid, Spain

Corresponding author.

E-mail address: jmherper@hotmail.com (J.M. Hernández Pérez).

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Echogenic Swirling Seen on Ultrasound and Outcome of Pleurodesis in Malignant Pleural Effusion



Ecografía con signo de remolino y resultado de la pleurodesis en un derrame pleural maligno

Dear Editor:

Malignant pleural effusion (MPE) is encountered in fifteen percent of patients with cancer¹ and frequently causes breathlessness that recurs after aspiration which necessitates more definitive treatment such as indwelling pleural catheter insertion or pleurodesis.² Talc is the agent used for pleurodesis in the UK² due to its superior efficacy compared to other agents¹ with success rates reported from large trials ranging between 75 and 80%.^{3,4} About one quarter of the patients receiving talc will require further procedures. Some parameters, such as pleural fluid pH and adeno-

sine deaminase^{5,6} have been correlated with pleurodesis outcome but these results have not been replicated in other studies and their overall clinical usefulness remains questionable.

Thoracic ultrasound (TUS) is an essential tool in the evaluation of pleural effusion.⁷ Echogenic swirling (ES), a finding which describes multiple floating echogenic particles inside an effusion (supplementary video), is seen on TUS examination of some patients with MPE and has been hypothesized to be related to enhanced intrapleural fibrinolytic activity.⁸ Effusions of MPE patients who failed pleurodesis were shown to have higher levels of fibrinolytic enzymes⁹ and MPE samples obtained following intrapleural application of sclerosants tended to exhibit more sustained elevation in levels of fibrin degradation products in patients who failed the procedure.^{10,11} This study aimed to assess whether an ultrasound parameter available prior to intervention (ES) is associated with reduced rates of pleurodesis success.

Data on patients who underwent thoracoscopic talc poudrage or talc slurry instillation via chest drain for the management of