spiral structure to an elongated filament) so it is exposed to protease ADAMTS13 activity and triggers proteolysis, which reduces the number of high molecular weight (HMW) vWF multimers. HMW vWF multimers are important for haemostasis; they mediate platelet aggregation and adhesion to the subendothelium of the damaged blood vessels and in situations of high-speed blood flow. The angiodysplastic vessels themselves are associated with high-speed blood flow. In the absence of these multimers, prolonged bleeding would be expected.[2–4,8]

Endoscopic treatments, embolisation, surgery, hormone therapy or octreotide only elicit short-term success.[8] Stenotic valve replacement is the most effective treatment, as it corrects the blood supply to the intestine and the decreased HMW vWF multimers.[2–4,8] A review of the Mayo Clinic[9] presented 57 cases of Heyde syndrome treated with AVR, with a follow-up of 15 years. 79% of patients had no recurrence of bleeding, with a bioprosthesis as the valve of choice. King et al.[10] observed a decrease in gastrointestinal bleeding after AVR in 93% of patients.

In patients with AS who develop anaemia due to gastrointestinal bleeding, as well as assessing the most common causes (ulcers, neoplasms, ischaemic colitis, etc.), the possibility of HS should be considered. In patients presenting with gastrointestinal bleeding of unknown cause, AS must be ruled out. The most effective treatment for complete resolution of the symptoms is AVR.

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Hypotension in hemodialysis secondary to a reaction to synthetic membranes☆

Hipotensión en hemodiálisis secundario a una reacción a membranas sintéticas

Dear Editor,

We present the case of an 84-year-old female patient on haemodialysis with a history of diabetes mellitus, arterial hypertension, dyslipidaemia, uric gout, two-vessel coronary artery disease (AD/RC), apical necrosis, severe LV dysfunction and moderate aortic stenosis. She receives treatment with insulin, furosemide, sevelamer, atorvastatin, carvedilol, weekly IV iron sucrose and darbepoetin alpha 30 μg weekly. She is dialysed through a left internal radiocephalic

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arteriovenous fistula, with ultra-pure dialysis fluid using a Helixona® FX-80 dialyser (polysulfone).

The patient developed episodes of hypotension and precordial pain intradialysis. After being assessed by cardiology, heart surgery is ruled out because of an increased cardiovascular risk based on her age and associated comorbidities, as is percutaneous treatment because of the unfavourable coronary anatomy. In the sessions, she usually presents with hypotension 15–20 minutes after the start, sometimes with dyspnoea and chest tightness. ECG with no signs of acute ischaemia and normal cardiac enzymes, with slow recovery after infusion of saline solution, ending the session with normal blood pressure. Sessions of dialysis are scheduled with oxygen therapy, low hourly ultrafiltration rate, UF profiles and decreased bath temperature, with no improvement. After changing to another polymethylmethacrylate membrane (PMMA) dialyser, BG 2.1 U®, the patient starts to tolerate better the hemodialysis sessions. Since subsequently changing to a cellulose triacetate membrane, she has not presented with any further hypotensive episodes. In tests, she also had moderate eosinophilia and thrombocytopaenia, which disappeared with the change of membrane.

Because of the patient's history, the intradialysis hypotensive episodes were first interpreted to be of cardiac origin, but as the change of membrane led to their complete disappearance, they were subsequently attributed to a reaction to the synthetic membrane. There was no history of allergies or eosinophilia, and other causes of hypersensitivity in dialysis such as the presence of endotoxins or other dialysis fluid pollutants,[1] ethylene oxide (EtO) as a sterilising agent (polysulfone is sterilised with steam and PMMA with gamma radiation),[2] iron allergy,[3] heparin[4] (anti-heparin antibodies negative) or latex[5] were ruled out.

This type of reaction to synthetic membranes may go unnoticed or be attributed to something else. They tend not to manifest at the initiation of the hemodialysis session. They are caused by pulmonary leukostasis secondary to complement activation by the dialysis membrane. The complement fraction C5a binds to the leucocyte receptors, eliciting their activation, aggregation and fixation to the pulmonary capillary endothelium, giving rise to leukopenia and hypoxaemia. The low leucocyte count gradually increases, reaching pre-session levels after an hour. The reaction resolves itself as the session goes on.[6,7] Cases of hypersensitivity reactions have been reported with the use of synthetic membranes, the majority due to polysulfone membranes, which contain an allergenic product, polyvinylpyrrolidone (PVP), used to hydrophilise the membrane. The PMMA membrane caused less complement activation and in this case, as with cellulose triacetate, it resolved the clinical symptoms.

A worsening of thrombocytopaenia has been reported with some dialysers, with a much higher platelet count recorded in PVP-free dialysers than in membranes containing PVP.[8] Some cases of thrombocytopaenia associated with respiratory symptoms have been reported, attributed to hypersensitivity to the dialyser[9,10]; those occurring in 2009/2010 were associated with sterilisation of the dialyser with gamma radiation.[11]

This case shows a reaction to polysulfone synthetic membrane, which manifests as hypotension and poor tolerance to haemodialysis in a heart disease patient and which disappears after switching to PMMA and cellulose triacetate membranes. The classification of type A and B hypersensitivity reactions is very wide-ranging and not very useful here because the majority are not hypersensitivity reactions. Of more use clinically is a causal classification which includes; early reactions due to complement activation; reactions to EtO, reactions to pyrogens, reactions to AN-69, reactions to drugs used in haemodialysis and reactions to synthetic membranes.

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