Partial splenic embolization in persistent idiopathic thrombocytopenic purpura

Embolización parcial esplénica en púrpura trombocitopénica idiopática persistente

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ABSTRACT

Immune thrombocytopenic purpura (ITP) is characterized by platelet destruction mediated by antibodies directed against the surface of the platelets. Corticosteroids are the first line of treatment of ITP. Thrombopoietin-receptor agonists have been recently introduced for a second-line treatment. Likewise, splenectomy is also considered a second-line therapeutic strategy in adults with steroid-resistant ITP. However, despite its low mortality, there is a tendency to avoid splenectomy due to its complications. Partial splenic embolization (PSE) has been used as an alternative to splenectomy, being a minimally invasive, safe and effective procedure. We present a case of patient with persistent ITP, who was treated with PSE prior to splenectomy, with the aim of improving platelet levels prior to surgery.

Keywords: immune thrombocytopenia purpura, partial splenic embolization, splenectomy, steroids.

RESUMEN

La púrpura trombocitopénica inmune (PTI) se caracteriza por la destrucción plaquetaria autoinmune. Los corticosteroides son la primera línea de tratamiento. Los agonistas de los receptores de trombopoyetina se han introducido como tratamiento de segunda línea. La esplenectomía se considera una estrategia terapéutica de segunda línea en PTI resistente a esteroides. Sin embargo, a pesar de su baja mortalidad, existe una tendencia a evitar la esplenectomía por sus complicaciones. La embolización esplénica parcial (PSE) se ha utilizado como alternativa a la esplenectomía, y es un procedimiento seguro y eficaz. Presentamos un caso de PTI persistente, tratado con PSE previo a la esplenectomía, con el objetivo de mejorar los niveles plaquetarios antes de la cirugía.

Palabras clave: púrpura trombocitopénica inmune, embolización esplénica parcial, esplenectomía, esteroides.

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INTRODUCION

Immune thrombocytopenic purpura (ITP) is a condition characterized by isolated thrombocytopenia of autoimmune origin. Its clinical signs can be asymptomatic, mild mucocutaneous hemorrhage or severe bleeding. Corticosteroids are the first-line therapy to treat ITP. As a second-line therapy other drugs like rituximab or thrombopoietin receptor agonists (TPO-RAs) have been proposed. Splenectomy is still considered a second-line therapy to treat corticoid-resistant ITP in adults since its response rate is around 60% to 80%. However, despite its low mortality rate, there is a tendency to avoid splenectomy due to its complications (infections, postoperative bleeding). Partial splenic embolization (PSE) has been used as an alternative to splenectomy since it is a minimally invasive procedure that does not require general anesthesia or laparotomy. Togasaki E. et al. described a case series where PSE was safe and effective.

This is the case report of a woman diagnosed with persistent ITP who remained unresponsive to multiple drug therapies. Since her platelet count was low, and risk of bleeding was high, a PSE was performed as a treatment prior to splenectomy to optimize platelet levels, reduce the need for transfusion support, and the risk of postoperative bleeding.

CASE REPORT

This is the case of a 19-year-old woman with a past medical history of treated tuberculosis. She remained on ongoing monitoring by the hematology unit following asymptomatic ITP after treatment with corticoids, gammaglobulines, romiplostim, rituximab, mycophenolate, vincristine, and cyclophosphamide. Since she remained unresponsive to these drugs, splenectomy was decided. The patient had been vaccinated against *Streptococcus pneumoniae, Haemophylus influenzae,* and *meningococcus bacteria.* Given the patient's low platelet count and risk of postoperative bleeding partial splenic embolization was performed to improve platelet levels prior to surgery. The percutaneous procedure was performed 7 days earlier.

Embolization technique

Local anesthesia and sedation were administered. Femoral arterial access was attempted using Seldinger technique. A 6-Fr introducer sheath (Terumo Corporation, Tokyo, Japan) was inserted. A Simmons Sidewinder 2 catheter

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Figure 1. *Baseline angiography of splenic artery. The target distal branches can be seen here.*

Figure 2. *Distal embolization of splenic artery. Selective angiography from microcatheter after embolization with particles. Lack of distal splenic blush confirmed.*

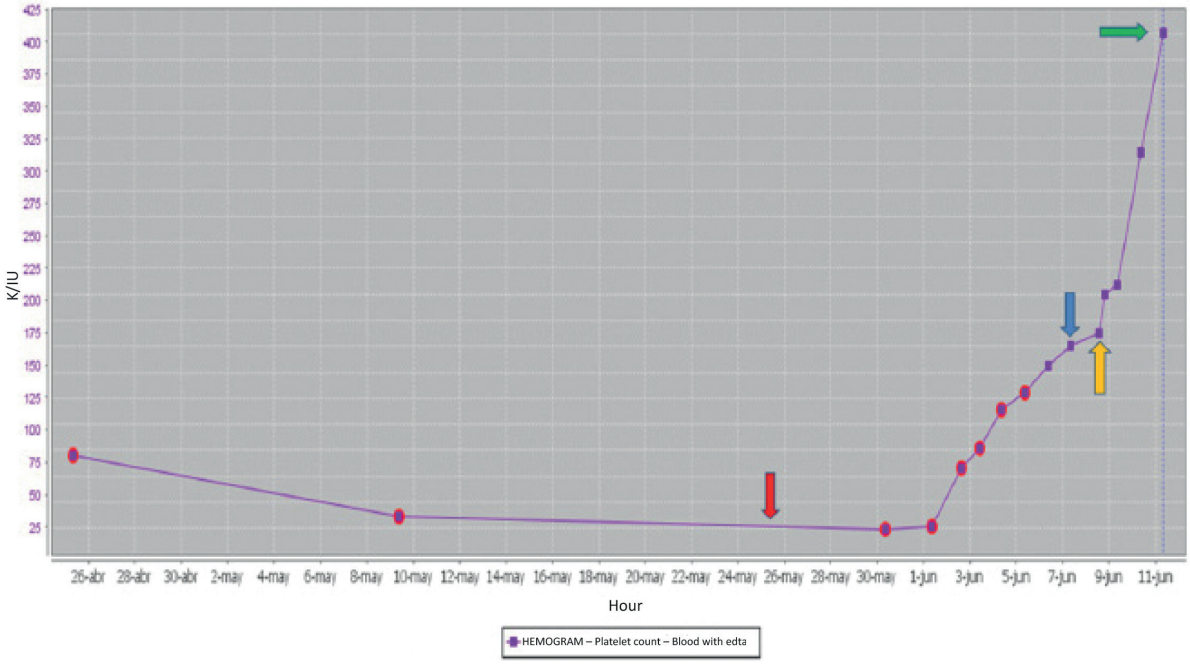

Figure 3. *Chart of platelet count across time. During drug treatment: 25 000 platelets/mm3 (red arrow). After PSE: 160 000 platelets/mm³ (blue arrow). After splenectomy: 180 000 platelets/mm³ (yellow arrow). At hospital discharge: 400 000 platelets/mm³ (green arrow).*

(Terumo Medical Corporation, Tokyo, Japan) was advanced through the introducer sheath. A selective arteriography of the celiac trunk splenic artery was performed to identify the target branches (figure 1). Afterwards a 2.7-Fr Maestro® microcatheter (Merit) was advanced until it reached the most distal and inferior portion (super-selective) of the splenic artery. Embolization started with polyvinyl alcohol (PVA) Contour® particles (Boston Scientific, Marlborough, Massachusetts, United States) sized 500 microns to 700 microns until achieving a lack of distal splenic flow (figure 2). After the procedure, 1 unit of platelets was transfused before removing the arterial introducer sheath followed by 20 min manual compression to achieve local hemostasis at the puncture site.

Evolution

No vascular complications were reported. Postoperative analgesia with opioids was administered for 48 hours. No signs of hypotension or fever were reported. The patient was treated with ceftriaxone for 48 hours. Afterwards, the patient was transferred to the operating room 7 days later with a platelet count of 160 000 platelets/mm³. Postoperative bleeding was minimum. At hospital discharge, the patient's platelet count was 400 000 platelets/mm³ (figure 3).

DISCUSSION

Immune thrombocytopenic purpura (ITP) is a syndrome characterized by multiple causal mechanisms that occur in different genetic settings, which determine the heterogeneous response to the treatments available. Thrombocytopenia is mediated by platelet destruction due to antibodies against platelet anti-glycoprotein , and CD T-cell-induced cytotoxicity (1).
Clinical signs of ITP can be asymptomatic or persistent mucocutaneous hemorrhage. Internal bleeding and hemarthrosis are rare (2).
Primary ITP presents with thrombocytopenia (platelet count < 100 000 platelets/mm^3) for the lack of an underlying systemic disease and is associated with a normal megakaryocyte count in the bone marrow. On the other hand, secondary ITP presents with thrombocytopenia (platelet count < 100 000 platelets/mm^3) and is associated with a recognizable condition (1).
The incidence rate of ITP is between 3.3 and 10 cases/100 000 inhabitants/year in adults (3).
Therapeutic target is to keep platelet count > 30 000 platelets/mm^3. Although numerous guidelines have been published with different expert opinions, there is still no consensus on the most adequate management of this condition (1).
In our country, clinical practice guidelines suggest the use of corticosteroids as first-line therapy plus gammaglobulines given the imminent risk of severe bleeding. The total response rate with steroids is between 50% and 80%, and it is estimated that 40% of the patients do not experience any relapses (3).
As second-line therapies, thrombopoietin receptor antagonists, romiplostim, and eltrombopag have been suggested. They have an overall response rate of 79% to 95% while the total response rate of monoclonal antibodies like rituximab is 65% (3-4-5).
Other third-line therapeutic options are highly chemotherapeutic immunosuppressant drugs with response rates of up to 50%. However, individual responses do not usually exceed 30%, and the appearance of adverse events complicates its prolonged use (3-6).
Splenectomy is a second-line therapy to treat ITP that remains unresponsive to drug therapy (7). Its total response rate is between 65% and 80% (8) with a perioperative mortality rate of 0.2% (9).
PSE is a minimally invasive procedure that has been recently implemented as an alternative to splenectomy in patients with steroid-resistant ITP (10). It does not require general anesthesia or laparotomy, and reports have not described the appearance of serious complications. Emi Togasaki et al. retrospectively studied the efficacy profile and long-term results obtained in 91 patients with corticoid-resistant ITP treated with PSE. The total response rate (TRR, platelets > 100 × 109/L) was 51 % (n = 46) while the overall response rate (ORR, platelets > 30 × 109/L) was 84% (n = 76). One year after the PSE, 70% of the patients maintained their platelet counts above the therapeutic target No PSE-related deaths were reported, which is indicative that the procedure was both safe and effective (10).
The most common complication is the so-called post-embolization syndrome due to inflammatory response to tissue necrosis. Its appearance has been reported in up to 30% of the patients. It is self-limiting and usually gone within a week. Treatment is basically symptomatic. Patients treated with partial splenic embolization should be vaccinated against *Streptococcus pneumoniae, Haemophylus influenzae,* and *meningococcus bacteria* (11).

CONCLUSION

Case reports and observational trials suggest that partial splenic embolization is a safe and effective procedure with a low rate of complications. In our case, the therapeutic strategy used increased platelet count and reduced procedural risk during splenectomy.

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