Leukapheresis in the management of drug rash with eosinophilia and systemic symptoms syndrome

Leucoaféresis en el tratamiento del síndrome de drug rash with eosinophilia and systemic symptoms

Dear Sir,

Drug rash with eosinophilia and systemic symptoms (DRESS) occurs in one out of every 1000–10,000 individuals exposed to drugs. The precise physiopathological mechanism involved is not clear, though two main theories have been proposed: (a) the development of an allergic hypersensitivity reaction in which the drug substance acts as a hapten or allergen; and (b) the absence of epoxide hydroxylase—an enzyme that mediates the detoxification of drugs that trigger the immune response. The disorder is often associated to reactivation of viruses belonging to the herpes family (HHV-6, HHV-7, Epstein–Barr and cytomegalovirus), though the relationship of this phenomenon to the etiopathogenesis of DRESS is not known.

The drugs most often associated to this syndrome are the aromatic antiepileptic agents (carbamazepine, phenobarbital) and allopurinol, though many others have also been implicated in DRESS, such as antibiotics, antituberculosis drugs (especially rifampicin), nonsteroidal antiinflammatory drugs (NSAIDs) and antivirals.

A series of diagnostic criteria for DRESS have been developed over the last decade: the European Registry of Severe Cutaneous Adverse Reactions to Drugs (RegiSCAR) and the Japanese Registry of Severe Cutaneous Adverse Reactions to Drugs (SCARJ) (Table 1).

Symptoms onset occurs between 2 and 8 weeks after introduction of the drug. The initial manifestations comprise fever (90–100%), morbilliform rash (87–90%), erythoderma with mucosal membrane involvement (22%) and generalized adenopathies (75%). An erythematous maculopapular reaction subsequently develops affecting the skin of the face, trunk and extremities, together with facial edema (25%). The third phase is characterized by multisystem involvement—the most frequently affected organ being the liver (50–60%) in the form of hepatomegalia and serum transaminase elevation, followed by hematological disorders (23–50%) in the form of eosinophilia and atypical lymphocytosis, and interstitial nephritis (11%) that may result in acute renal failure. Less frequent manifestations are (interstitial pneumonia 9%), carditis (pericarditis or myocarditis) and even meningitis or encephalitis. The mortality rate associated to DRESS is 10%, and is mainly conditioned by the age of the patient and liver and kidney involvement.

The management of DRESS comprises suspension of the suspect drug and the administration of glucocorticoids at a dose of 1–2 mg/kg/day. If the condition persists despite such measures, 1 g/day pulses of methylprednisolone can be prescribed during three days. In cases that do not respond to the adopted treatments, there have been reports of a good outcome following the administration of systemic immunoglobulins or plasmapheresis.

We present the case of a 21-year-old male without known drug allergies who developed cough, fever and right-side pleural effusion. In addition to the pleural effusion, computed tomography revealed right pleural thickening and the

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Diagnostic criteria of DRESS.</th>
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<tr>
<td><strong>RegiSCAR</strong></td>
<td><strong>SCARJ</strong></td>
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<tr>
<td>- Acute skin rash</td>
<td>- Maculopapular rash developing &gt; 3 weeks after start of drug</td>
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<tr>
<td>- Suspected drug reaction</td>
<td>- Persistence of symptoms &gt; 2 weeks after drug suspension</td>
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<tr>
<td>- Fever &gt; 38 °C*</td>
<td>- Fever &gt; 38 °C</td>
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<tr>
<td>- Blood count anomalies: eosinophilia, leukopenia or lymphocytosis, thrombocytopenia*</td>
<td>- Leukocyte anomalies: atypical lymphocytosis (&gt;5%); leukocytosis (&gt;1.5 × 10⁹/l); eosinophilia (&gt;1.5 × 10⁹/l)</td>
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<tr>
<td>- Adenopathies &gt; 2 sites*</td>
<td>- Adenopathies</td>
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<tr>
<td>- Involvement of at least one internal organ*</td>
<td>- Liver alterations (ALT &gt; 100 IU) or involvement of other organs</td>
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<tr>
<td>- Hospitalization</td>
<td>- HHV-6 reactivation</td>
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SCARJ: all 7 criteria are to be met for establishing the diagnosis; RegiSCAR: 3 of the 4 criteria marked by an asterisk (*) are required to establish the diagnosis.

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The course proved unfavorable despite the treatment measures, with gradual intensification of the eosinophilia to $7.5 \times 10^6$ cells/l and the appearance of myocardial dysfunction with global hypokinesis (left ventricular ejection fraction 45%) and a troponin I concentration of 4 ng/ml. Cardiac involvement secondary to eosinophilic infiltration was suspected. In view of the rapid progression of organ dysfunction, with no response to glucocorticoid therapy, and after 5 days of treatment, plasmapheresis was carried out, with poor hemodynamic tolerance. We therefore replaced plasmapheresis with a session of leukapheresis and granulocyte apheresis (the aim being to capture the granulocyte interphase, block the inflammatory response and eliminate the peripheral blood stem cells and avoid eosinophilic proliferation), followed by the administration of hydroxyurea in order to block bone marrow eosinophil proliferation. Following these treatment measures, the eosinophil count decreased rapidly and continuously, with a favorable clinical course allowing withdrawal of all the supportive measures and patient discharge from the ICU within 6 days.

Drug rash with eosinophilia and systemic symptoms (DRESS) is an often underdiagnosed and potentially fatal disorder, with a growing incidence. An early diagnostic suspicion is required in order to eliminate the causal agent as soon as possible and start first line treatment. In the absence of a response to glucocorticoids, second line therapy with immunoglobulins or plasmapheresis is considered. In our case leukapheresis was decided in view of the seriousness of the clinical condition and patient intolerance of plasmapheresis. Apheresis involves the removal of certain cellular components from blood—leukocytes being removed in the case of leukapheresis. This technique is indicated for the management of hyperleukocytosis (hematological malignancies with $>10^6$ leukocytes/l) prior to chemotherapy, with the aim of obtaining CD34 progenitor cells for bone marrow transplantation, among other conditions. Its use in successfully treating hyper eosinophilia has not been reported to date. We therefore decided to describe this potential indication of apheresis, which caused no complications and proved very successful in the context of a patient with extremely serious multiorgan dysfunction.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

References

Cooperative sedation: An option for the management of agitation in moderate traumatic brain injury

Sedación cooperativa: opción para el manejo de la agitación en el traumatismo craneoencefálico moderado

Dear Sir,

Moderate traumatic brain injury (MTBI) represents 20% of all brain injuries, and includes patients with a Glasgow coma score of 9–13. The associated mortality rate is 15%, and close to 50% of all patients suffer sequelae. Moderate traumatic brain injury is very heterogeneous in terms of its severity and clinical course. It affects young adults as well as elderly people, and one-third suffer intracranial injuries. In such cases pain and agitation are more common as a result of neurological damage, trauma in other body regions, and the consumption of alcohol or drugs of abuse. Agitation can moreover magnify brain damage through different mechanisms: increased metabolism and oxygen consumption, increased intracranial pressure (ICP), lowered cerebral perfusion pressure (CPP), increased cardiovascular stress, and altered ventilation and oxygenation. Likewise, agitation complicates physical examination and diagnostic and therapeutic interventions. Adequate sedoanalgesia is essential in this respect, since both over- and under-sedation can contribute to secondary brain damage.

In contrast to severe traumatic brain injury (STBI), where different clinical guides have established recommendations referred to sedoanalgesia, no such recommendations have been made in the case of MTBI. In this case, the recommendations established for STBI are commonly used. These recommendations usually comprise high-dose midazolam, remifentanil and propofol – i.e., drugs that alter patient level of consciousness, complicate neurological exploration and lead to the indication of invasive mechanical ventilation. Dexmedetomidine (DEX), a sedating and analgesic agent that acts by stimulating the α2-adrenergic receptors within the locus coeruleus and spinal cord, makes it possible to administer what is known as “cooperative or conscious sedation” – defined as sedation in which the patient is calm and comfortable, and is able to respond adequately and immediately to tactile and verbal stimuli. This makes it possible to assess the neurological condition, with preservation of the defensive reflexes of the airway and spontaneous ventilation, and systemic hemodynamic stability. Dexmedetomidine can cause arterial hypotension and bradycardia secondary to sympatholysis; these effects can be avoided by suppressing the loading dose, titrating the drug dosage, and maintaining strict normovolemia. The drug does not alter ICP or cerebral oxygenation, and exerts neuroprotective effects.

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