Pancytopenia due to copper deficiency in a hemodialysis patient☆

Pancitopenia secundaria a déficit de cobre en un paciente en hemodiálisis

To the Editor:

Acquired copper deficiency is a rare disorder that has been described as being associated with gastric bypass surgery, gastrectomy, excessive zinc intake or administration of total parenteral nutrition without adequate copper contributions.[1,2]

Copper deficit causes different haematological and neurological alterations, such as pancytopenia, myelopathy and peripheral neuropathy, as well as skeletal alterations such as osteoporosis.[2] Although it is rare, its incidence has increased as a result of the increase in bariatric surgery, since the absorption of copper is carried out in the stomach and the proximal duodenum.[3]

We present the case of a patient under treatment with chronic haemodialysis, who presented severe pancytopenia associated with copper deficiency secondary to a malabsorption syndrome due to gastric bypass surgery.

The patient is a 61-year-old man with chronic kidney disease secondary to diabetic nephropathy and hyperfiltration, on chronic haemodialysis since September 2016. In October 2015, he underwent gastric bypass surgery, subsequently developing short bowel syndrome with malabsorption.

Laboratory tests at the start of haemodialysis showed: normocytic/normochromic anaemia (Hb 10.6 g/dl, Ht 33.5%, MCV 96.4, MCH 30.4), thrombocytopaenia (platelets 107,000), normal white blood cells (5,170, normal formula), transferrin 104 mg/dl (normal 200–360), ferritin 397 ng/ml (normal 20–300), iron 27 μg/dl (normal 65–175) and transferrin saturation 18%. Levels of vitamin B_{12} and folic acid were normal.

Treatment was started with intravenous iron 200 mg/month and erythropoietin 9000 U/week. Progressive anaemia has been observed since February 2017, despite a progressive increase in the weekly dose of erythropoietin, as well as increased thrombocytopaenia and leukopenia (Table 1). The reticulocyte count and blood smear were normal. Given the suspicion that pancytopenia was secondary to a copper deficit due to his history of gastric bypass, serum copper was tested, and showed low levels of 15 μg/dl (normal 75–150), in addition to ceruloplasmin, which was 6 mg/dl (normal 20–60). Serum zinc was normal: 84 μg/dl (60–150).

We started treatment with oral copper supplements (copper sulphate, 2 mg + copper carbonate, 1 mg), observing progressive improvement in haematological alterations, as well as normalisation of copper and ceruloplasmin levels after 3 months of treatment. However, given the persistence of the malabsorption syndrome, it was decided to reverse the gastric bypass in September 2017.

Hypocupraemia is a rare finding in haemodialysis patients, and in most cases, normal or elevated levels have been described in the general population.[4] The case presented here developed severe pancytopenia secondary to copper deficit, as a consequence of gastric bypass surgery, with no neurological alterations, since these are usually preceded by haematological alterations.[5] The recovery of the haematological symptoms was fast and practically complete after copper supplementation. However, recovery is usually incomplete in cases of neurological involvement.

Considering that the incidence of copper deficit has increased as a result of the increase in gastric bypass surgery, and given that the neurological alterations may be irreversible, we recommend the determination of serum copper in these patients, mainly if they present haematological alterations that point to this nutritional deficit.

Table 1 – Evolution of haemoglobin, platelets, white blood cells and the weekly dose of erythropoietin.

2017	Haemoglobin, g/dl	Platelets	White blood cells	Erythropoietin dose, U/week	Serum copper, μg/dl/ceruloplasmin, mg/dl
January	10.6	107.000	5100	9000	
February	8.7	100,000	4400	12,000	
March	8.4	45,000	2380	15,000	
April	7.6	49,000	2040	24,000	15/6
July	10.7	102,000	4900	15,000	81/28

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Report on the first kidney transplant chain in Mexico☆

Reporte de la primera cadena de trasplante renal en México

To the Editor:

The best way to comply with funding policies is to declare the entity that has funded your research study and the grant that you have received. We found no reference to the funding of your research study in your manuscript. Please confirm that this is correct. If you would like to declare an entity that has funded your research, please specify that entity's full name and country as well as the IDs of the grant in the text of your article.

Chronic kidney disease (CKD) is currently considered a pandemic disease affecting approximately 10% of the adult population throughout the world.[1] In Mexico, the incidence and prevalence of CKD requiring replacement therapy has been calculated to be 466 cases per million people (pmp) and 1409 pmp, respectively.[2]

Kidney transplant (KT) is undoubtedly the therapy of choice for these patients. According to information from the National Transplant Centre (Centro Nacional de Trasplantes, CENATRA), 12,741 patients are on the waiting list for KT, of which it is estimated that 30% are sensitised.[3,4]

In about 30% of patients, the potential donor is incompatible with the recipient, either due to incompatibility of the blood group (ABO) or to immunological incompatibility. The natural alternative for recipients who are incompatible with their potential donors is to add them to the waiting list to receive a cadaveric transplant.

Due to the permanent increase in patients with chronic kidney disease requiring replacement therapy, candidates for transplantation and the concomitant shortage of organs, alternatives for incompatible pairs have been proposed, such as paired, chained or sequential KT, in order to increase the number of patients that may benefit from KT.

The purpose of this report is to describe the first 12 months of post-transplant evolution of recipient patients who participated in the first KT chain carried out in Mexico.

We reviewed the list of renal failure patients in replacement therapy who had initiated the protocol for KT at INCMNSZ and had been incompatible with their potential living donors. The procedure was explained to them and they were asked to sign the informed consent form. After histocompatibility tests were performed and patients had been assigned using a computer programme developed for this event, a total of 4 chain donation transplants were performed.

Different combinations of potential chains were obtained from a population of 20 non-compatible pairs, starting with the "altruistic" donor and ending with a recipient on the waiting list.

Table 1 shows the clinical, demographic and immunological characteristics of the patients. All recipients received triple immunosuppression treatment based on tacrolimus, mycophenolate mofetil and prednisone according to the dose and blood levels stipulated in the institutional protocol; all received induction therapy. All 4 transplants took place without surgical complications in donors and recipients; the 4 recipients showed immediate graft function.

At 12 months, all recipients are alive with good renal function, observing good glomerular filtration rates (GFR) as estimated by MDRD equation (Fig. 1). In terms of immunological events, there were 2 acute rejections mediated by antibodies. In both patients, these rejections were managed using the current standard treatment, which includes plasmapheresis, intravenous immunoglobulin, rituximab and

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