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Scientific letter

Hemoglobinuria following reabsorbed hemoperitoneum☆

Hemoglobinuria posterior a reabsorción de un hemoperitoneo

In 1959, Cohn et al. published in JAMA the first case of haemoglobinuria secondary to haemoperitoneum reabsorption. In the last 65 years, only one case has been published in the literature in 2009, we reported the third case.

We present the case of a 19-year-old male patient with a history of cholecystolithiasis who underwent elective laparoscopic cholecystectomy. On the first postoperative day, he developed tachycardia and fainting. On the second postoperative day, blood tests showed a drop in haemoglobin (Hb) levels from the preoperative level from 15 g/dL to 9.4 g/dL. Abdominal ultrasound showed free fluid in the perihepatic and perisplenic spaces and in the right parietocolic space. Following the ultrasound, it was found that the patient was haemodynamically stable, with mean arterial pressures >65 mmHg, no longer had tachycardia and was in a good general condition, so he was managed conservatively and under strict clinical observation with a good response. A CT scan was ruled out due to the low probability of change in behaviour and the associated costs, with the confidence that in the event of any clinical deterioration, one would be available 24-h. Given the favourable evolution, he was discharged on the third postoperative day in good condition.

On the eighth postoperative day, the patient attended the emergency department with "bloody urine" (Fig. 1A), mild ecchymosis and slight pain in the surgical wounds, with no other relevant symptoms. Upon admission, the patient was in good condition and haemodynamically stable. Urinalysis with a dipstick was positive for an estimated 300 erythrocytes/uL and an urobilinogen of 4 mg/dL. Specifically, only 5 to 10 red blood cells were visible under the microscope.

Laboratory confirmed stable haemoglobin levels since discharge, total bilirubin of 2.83 mg/dL with direct bilirubin of 1.38 mg/dL, elevated transaminases <2 times the normal range, alkaline phosphatase and gamma glutamyl transpeptidase <1.5 times the normal range. Abdominopelvic CT revealed free fluid with blood density in the right abdominal quadrants, consistent with the ultrasound prior to discharge and magnetic resonance cholangiography that ruled out bile duct injuries.

He was hospitalised and was managed conservatively, with intravenous hydration and standard analgesia. Serial urine and blood tests were performed, with significant macroscopic clearance of urine (Fig. 1B) and dipstick urinalysis showing a decrease in the estimated red blood cell count (Table 1), with no red blood cell appearance on microscopy. In parallel, there was a trend toward higher blood Hb levels at the 11th postoperative day check-up, with no evidence of iron deficiency. The patient evolved favourably, being discharged 4 days after hospitalisation.

There are currently limited data on the relationship between haemoperitoneum and haemoglobinuria. To our knowledge, there are only two case reports in the published literature. The first published case was of a patient with postpartum gynaecologic haemorrhage,[1] and the other was after elective laparoscopic splenectomy.[2] Both groups suggested that there was autologous transfusion of red blood cells into the vasculature from the peritoneal cavity through diaphragmatic stomas,[1,2] which was demonstrated in 20th century physiological studies.[3] Interestingly, there is data that these red blood cells are reabsorbed and reappear in the circulation within 1 to 2 weeks.[4] These data, however, do not explain the occurrence of haemoglobinuria in these patients. Rather, this may be explained by a rapid rise in haemoglobin levels after major peritoneal haemorrhage without heterologous transfusion.[1,2]

☆ Please cite this article as: Korn O, Morales Á, Sapiain S, Vial MJ. Hemoglobinuria posterior a reabsorción de un hemoperitoneo. Cir Esp. 2024. https://doi.org/10.1016/j.ciresp.2024.08.002.

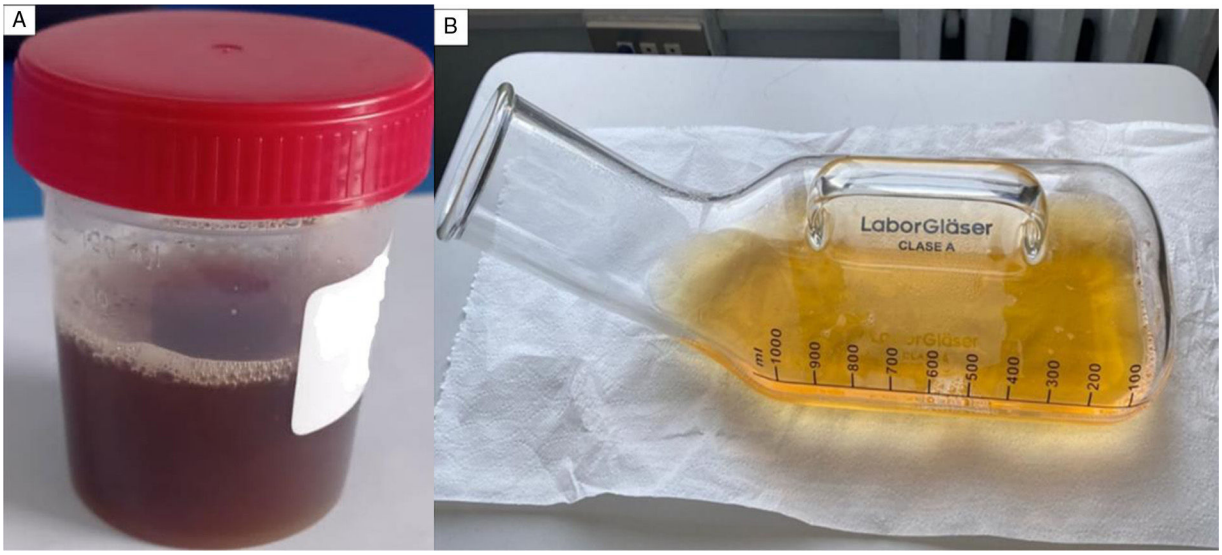

Fig. 1 – Macroscopic urine appearance.

Table 1 – Haemoglobinuria and serological values.

	Pre OP	PO 1	PO 8	PO 10	PO 11	PO 12
Serum Haemoglobin (mg/dL)	15.2	9.4	9,5	–	10,6	9.5
Haematocrit (%)	46,4	28.0	28.2	–	32.0	28.2
Haemoglobinuria (dipstick)	–	–	++++	++	++	+

When massive haemoperitoneum occurs, there is a process of haemolysis within the peritoneal cavity, and this free haemoglobin is reabsorbed by the peritoneal serosa entering the systemic circulation; this process begins approximately after the fourth day of haemoperitoneum.[2] This ''free'' haemoglobin binds to haptoglobin until this system is saturated. When plasma haemoglobin levels exceed the haptoglobin binding capacity, ''free'' haemoglobin begins to filter through the glomeruli into the renal tubules, being reabsorbed by the latter into the plasma. However, similar to the known mechanism that explains glucosuria in diabetes mellitus, this reabsorption of haemoglobin also has a threshold. Thus, when the supply of haemoglobin in the renal tubules exceeds this reabsorption threshold, haemoglobinuria appears without evidence of erythrocytes on microscopy.[5]

The time of appearance of haemoglobinuria in the cases described in the literature occurred on the 7th postoperative day, similar to that which occurred in this case, where it was noted by the patient on the 8th day and confirmed in the laboratory on the same day.[1,2] According to the evolution described in the published reports, haemoglobinuria progressively decreased until the tenth postoperative day.[1,2]

It is important to consider haemoglobinuria in postoperative patients who arrive at the emergency department as a differential diagnosis of ''bloody urine'' or choluria. It should be noted that, in this case, an elevated concentration of bilirubin in blood and urine was also observed, which in the context of a cholecystectomy should raise suspicion of a possible injury to the bile duct. In this context, and when faced with an image showing an intact bile duct, haemoglobinuria should raise suspicion of a haemolytic process, perhaps in the context of reabsorption of a haematoma or haemoperitoneum.

This phenomenon, described in 1931 by Robertson[6] in traumatized patients, with the statement ''Haemoglobinuria will follow haemorrhage, anywhere in the body,'' is a long-forgotten semiological tool that deserves to be considered again among the diagnostic tools of modern medicine.

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2173-5077/