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Massive right-sided colon diverticular bleeding complicated by the transfusion related acute lung injury (TRALI)

Case Report

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Abstract: Colonic diverticulosis is a condition which causes extensive bleeding of the lower gastrointestine in 40-50% of cases. In particular, right-sided diverticulosis, although uncommon requires lifesaving colectomy. Transfusion related acute lung injury (TRALI) is a transfusion reaction, which can occur after administration of various blood products. Although life threatening, it can be completely reversed usually within 72 to 96 hours. Here, we report a case of a young Caucasian male hospitalized due to severe anemia, hematochezia and extensive blood loss, all due to lower gastrointestinal hemorrhage from right-sided diverticulosis. These conditions were overlooked endoscopically and diagnosed then treated surgically with the right-sided hemicolectomy. During postoperative course, four hours after the last transfusion, patient developed fever, hypoxia and noncardiogenic pulmonary oedema, but made complete recovery through aggressive oxygen support within 96 hours. The aim of this case was to review current literature, to draw attention to a serious and under-diagnosed transfusion reaction, as well as discuss possible explanations for the diagnostic difficulties that occurred in this case.

Keywords: *Colonic diverticulosis • Blood transfusion • Acute lung injury • Gastrointestinal endoscopy*

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1. Introduction

Gastrointestinal (GI) bleeding frequently requires blood transfusions and their administration is an everyday practice for most clinicians. Adverse effects of transfusions such as febrile and anaphylactic reactions are well known and usually treated successfully. Transfusion related acute lung injury (TRALI), on the other hand, is rarely thought of and often under diagnosed.

Here, we report a case of a 42 year-old male with reoccurring immense lower gastrointestinal bleeding and serious pulmonary complication due to blood transfusion. The aim of this case was to review current literature and draw attention to this life threatening transfusion reaction.

2. Case report

A 42 year-old male Caucasian was admitted in our hospital due to hematochezia, severe anemia, malaise, loss of appetite and dizziness. On admission, heart rate was 100 per minute and blood pressure was 120/70 mmHg. Upper endoscopy showed reflux oesophagitis, hiatus hernia and chronic erythematous gastritis. Early elective total colonoscopy revealed blood and coagula throughout the colon without visible source of bleeding. Computerised tomography (CT) angiography of abdominal aorta excluded further suspicion of an aortoenteric fistula. Patient received transfusions of packed red blood cells (PRBC) and fresh frozen plasma (FFP), proton pump inhibitors and saline.

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On the third day of hospitalization, due to extensive lower GI bleeding, prominent anemia and hemodynamic instability, patient was rushed into the operating theatre. Intraoperative upper endoscopy revealed an ulcer on the front ventricular wall Forrest II and an angiodysplasion in the antral part of the gut. The ulcer was sutured and further colonoscopy performed reaching to the lienal flexure. There was no visible sign of bleeding lesions. On the third postoperative day, extensive bleeding of the lower GI reoccurred and required immediate relaparotomy. Intraoperative upper endoscopy was performed again and showed no signs of bleeding. Mobilization of the whole colon revealed presence of numerous bleeding diverticula of coecum and ascending colon sizing to 1.5 cm (Figure 1). Endoscope was then inserted at the appendectomy site and ileum, jejunum, and colon were explored confirming the diagnosis. Upon right hemicolectomy, the terminal ileostomy was successfully performed.

During hospitalization, due to extensive blood loss, patient required numerous transfusions and received, in total, 32 units of PRBC and 15 units of FFP. Four hours after the last transfusion, patient abruptly developed an acute lung injury (ALI) with tachypnoea, fever, acute hypoxia with hemoglobin oxygen saturation down from 100% to 69% and PaO_2/FiO_2 206 mmHg and auscultatory finding of diffuse crackles and decreased breath sound. Central venous pressure (CVP) was 3 mmHg. Chest X-ray showed bilateral fluffy infiltration (Figure 2). Treatment included invasive mechanical ventilation and course of corticosteroids, which led to patient's full recovery within 96 hours. Diagnosis of TRALI was made based on a typical clinical and radiological presentation as well as prompt full recovery with exclusion of other causes of acute lung injury (ALI). The transfused units of PRBC and FFP were not examined for antibodies.

3. Discussion

Blood transfusion, which is frequently used in treatment of posthemorrhagic anemia, has many reported side effects. TRALI is a transfusion reaction clinically presenting as acute lung injury temporally connected to transfusion [1-5]. TRALI usually appears within 6 hours of transfusion and resolves in 72 to 96 hours with aggressive respiratory support showing mortality rates of about 5 to 10% [1-4,6-8]. Precise incidence of TRALI is unknown, ranging from 1 case in 1323 to 1 case in 5408 transfused units [3,4,6]. All sorts of blood products can be causative agents, the most common being platelet concentrates and FFP [3,4,6,9]. There are two leading theories explaining possible pathways [5,7]. According to the first, TRALI is a consequence of host human leukocyte antigens (HLA) or non-HLA and transfused donor antibody reaction on the surface of neutrophilic leukocytes, which leads to their activation, interstitial and alveolar edema, hyaline membrane formation and destruction of normal lung parenchyma [3-7,9]. The econd theory is popularly known as the "two event" model whereby massive transfusion, major surgery, active bacterial or viral infection and cytokine administration or some other stimulus, prime the immune system and are considered to form the "first event" [2-7,9,10]. The "second event" is the transfusion and it propels already activated immunoinflammatory response [3,10].

TRALI is clinically diagnosed, according to criteria established and suggested by the Canadian Blood Services and the International Society of Blood Transfusion's Committee on Biomedical Excellence for Safer Transfusion [2,5,8,9]. It is characterized by the insidious onset of profound hypoxia, fever, tachipnea and non-cardiogenic pulmonary edema and it should be dis-

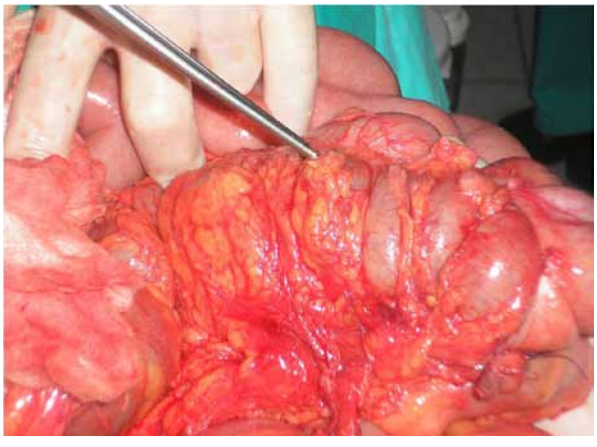

Figure 1. Intraoperative view of multiple, large bleeding diverticula of the colon.

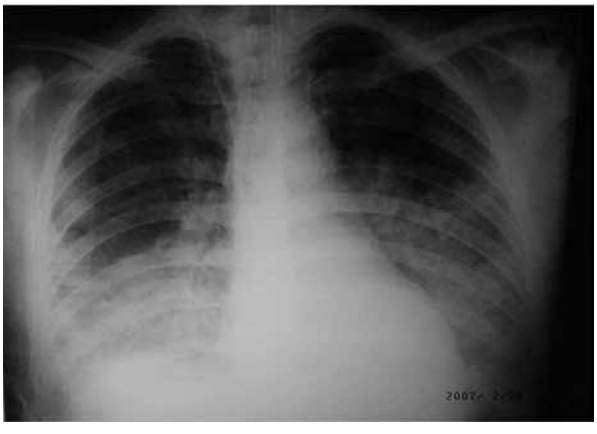

Figure 2. Bilateral fluffy infiltration on chest X ray performed when patient developed acute hypoxia, tachypnea and fever 4 hours after transfusion.

tinguished from the transfusion associated circulatory overload (TACO), anaphylactic reaction and transfusion related bacterial sepsis [1-6,8,9].

Our case showed typical pattern for TRALI, comprising sudden onset of respiratory failure and complete resolution in less than 96 hours upon treatment with oxygen. However, other transfusion reactions had to be excluded, in the first place TACO. We ruled out TACO on the clinical bases, since respiratory distress in our patient was not accompanied by the signs of circulatory overload, but had normal CVP and no previous history of heart disease. Furthermore, his case fitted the "two event" model perfectly, the "first event" being two major surgeries, each lasting over 200 minutes, along with the transfusion of PRBC and FFP, leading to a non-cardiogenic pulmonary edema.

Besides TRALI, the clinical course and diagnostics of the underlying cause of gastrointestinal bleeding in this patient was complicated. Even though, bleeding of GI is one of the leading gastrointestinal emergencies, it took three colonoscopies and two major surgeries to establish the source of bleeding in this case. More, it is possible that diagnostic failure of colonoscopy was due to several circumstances - unexpected etiology and site of lower GI bleeding since colonic diverticulosis is mostly found in elderly patients and is usually localized in the sigmoid and descending colon. Although rare, right-sided colon diverticulae, like those found in our patient, are usually a characteristic of Asian population [11-13]. Nevertheless, colonoscopy should be performed initially, since it can be both diagnostic and therapeutic for the lower gastrointestinal hemorrhage [14-16]. However, disagreement still remains whether prior bowel preparation is required [15,17]. In our opinion, bowel preparation, which was not performed in this case, would not have affected colonoscopic findings since the intermittent nature of diverticular bleeding. There are other reports presenting the chance of overlooking diverticula using colonoscopy as a diagnostic method [12,17], thus leaving surgery the last option for treating unstable patients who require substantial transfusion [11,12,18,19].

In conclusion, clinicians have to be aware of TRALI whenever there is a patient who develops ALI or ARDS, which can be connected with previous transfusions. Especially, increased awareness is necessary with patients who require large amounts of blood products. Since donor antibodies are presumably the most common culprit, strict indications for transfusions must be followed. When possible, laboratory testings should be performed in order to identify donor antibodies, although this is not obligatory in diagnosing the the TRALI. The main purpose of laboratory testing is to identify those donors who should be excluded from further blood donations.

References

[1] Moore Breanndan S. Transfusion – related acute lung injury (TRALI): Clinical presentation, treatment, and prognosis. Crit Care Med 2006, 34 Suppl 5, 114-117

[2] Triulzi DJ. Transfusion – related acute lung injury: An update. Hematology 2006, 497-501

[3] Silliman CC, McLaughlin NJD. Transfusion – related acute lung injury. Blood Rev 2006, 20, 139-159

[4] Silliman CC, Ambruso DR, Boshkov LK. Transfusion – related acute lung injury. Blood 2005, 105(6), 2266-2273

[5] P'Ng SS, Hughes AS, Cooney JP. A case report of transfusion-related acute lung injury during plasma exchange therapy for thrombotic thrombocytopenic purpura. Ther Apher Dial 2008, 12(1), 78-81

[6] Shander A, Popovsky MA. Understanding the consequences of transfusion – related acute lung injury. Chest 2005, 128, 598-604

[7] Curtis BR, Mc Farland JG. Mechanisms of transfusion – related acute lung injury (TRALI): Anti – leukocyte antibodies. Crit Care Med 2006, 34(5), 118-123

[8] Fontaine MJ, Malone J, Mullins FM, Grumet FC. Diagnosis of transfusion-related acute lung injury: TRALI or not TRALI? Ann Clin Lab Sci 2006, 36(1), 53-58

[9] Fung YL, Goodison KA, Wong JKL, Minchinton RM. Investigating transfusion-related acute lung injury (TRALI). Intern Med J 2003, 33, 286-290

[10] Silliman CC. The two – event model of transfusion – related acute lung injury. Crit Care Med 2006, 34 Suppl 5, 124-131

[11] McQuaid KR. Gastrointestinal disorders. In: McPhee SJ, Papadakis MA. Current medical diagnosis and treatment 2009, Forty-Eight Edition. The McGraw-Hill Companies, 2009: 487-581

[12] Stollman NH, Raskin JB. Diagnosis and management of diverticular disease of the colon in adults. Am J Gastroenterol 1999, 94(11), 3110-3121

[13] Steth AA, Longo W, Floch MH. Diverticular disease and diverticulitis. Am J Gastroenterol 2008, 103, 1550-1556

[14] Pilichos C, Bobotis E. Role of endoscopy in the management of acute divertcular disease. World J Gastroenterol 2008 April 7, 14(13), 1981-1983
[15] Adams JB, Margolin DA. Management of diverticular hemorrhage. Clin Colon Rectal Surg 2009, 22(3), 181-185
[16] Jensen DM, Machicado GA, Jutabha R, Kovacs TOG. Urgent colonoscopy for the diagnosis and treatment of severe diverticular hemorrhage. N Eng J Med 2000 Jan 13, 342(2), 78-82
[17] Hoedema RE, Luchtefeld MA. The management of lower gastrointestinal hemorrhage. Dis Colon Rectum 2005, 48, 2010-2024
[18] Wong Kee Song LM, Baron TH. Endoscopic management of acute lower gastrointestinal bleeding. Am J Gastroenterol 2008, 103, 1881-1887
[19] Steel M. Colonic diverticular disease. Aust Fam Physician 2004, 33(12), 983-986