

## CASE REPORT

# Non-surgical bleeding in cardiac surgery

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## Abstract

Bleeding is an occurrence stemming from complex interactions encountered in cardiac surgery and is often attributed to the perioperative administration of anti-thrombotic products if inadequate surgical haemostasis is excluded. Very occasionally, bleeding does not fit the norm and the aetiology is not a lack of surgical prothrombin or an iatrogenic-induced coagulopathy. Patients who present for cardiac surgery should be questioned carefully for a history of bleeding; however, patients at risk are not always identified. This case presents a series of haemorrhagic events incorrectly labelled as surgical complications resulting from an uncommon but not insignificant undiagnosed condition. The existing literature outlining protocols to safely manage patients with haemophilia during the perioperative cardiac surgical period is discussed in this report. This case explicitly demonstrates the importance of preoperative identification to avoid the morbidity that can result from cardiac surgery in an undiagnosed haemophilic patient.

## INTRODUCTION

Haemophilia A and B are sex-linked recessive inherited conditions. The conditions result in various degrees of factor VIII and IX deficiency, respectively, impairing the clotting cascade [1]. The life expectancy of haemophilia patients is increasing and they are confronted with age-related co-morbidity, including ischaemic heart disease. Replacement of the deficient factor is the cornerstone of treatment, with other therapeutic options including tranexamic acid, desmopressin and aprotinin.

Patients with severe haemophilia (factor levels < 0.01 IU/ml) are usually diagnosed in early life, but in mild cases (factor levels > 0.05 IU/ml), the diagnosis may be delayed. A detailed clinical history may be the most reliable way to screen for mild cases of haemophilia where preoperative coagulation studies may be normal if factor VIIIc activity is >20%.

This report presents a patient with no documented bleeding history who underwent cardiac surgery, suffering significant postoperative bleeding and protracted recovery.

## CASE REPORT

A 70-year-old gentleman with chronic, stable angina presented for elective coronary artery bypass grafting (CABG). Being a non-smoker and a non-diabetic, his cardiac risk factors included: an increased BMI of 32, a strong family history of ischaemic heart disease, hypercholesterolaemia and hypertension. He was a retired manager with an additional medical history of a left nephrectomy 44 years previously.

Coronary artery angiography and echocardiography diagnosed left main stem three-vessel disease with good left ventricular function.

The patient underwent on-pump coronary artery bypass surgery with a pedicle left internal mammary artery (LIMA) grafted to the left anterior descending artery (LAD) and long saphenous vein grafts anastomosed to the posterior descending artery, first obtuse marginal branch and first diagonal branch. Initially, the patient was transfused 500 ml of pump blood. As a consequence, the activated clotting time was noted to be 200 s and in the first

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	Immediately Pre-operative	Immediately Post-operative	Reference range
APTT (Seconds)	41.6	52.6	23-34
PT (Seconds)	16	21.5	10-14

Figure 1: Perioperative coagulation profile.

hour 200 ml of blood drained from the chest drains. Protamine was administered and together with active re-warming, a reduction in the drain output was observed. Six hours postoperatively the total recorded drainage was 700 ml, slowing to 30 ml per hour (Fig. 1).

As per the standard CABG protocol, the patient received 300 mg aspirin per rectum 6 hourly postoperatively. One hour after aspirin administration, the drain output accelerated and 900 ml was recorded over the subsequent 3-h period. The patient was returned to theatre and several small superficial bleeding points were identified, but no active bleeding from any of the surgical sites was found. An uneventful recovery followed, and the patient was deemed fit for discharge on the 7th postoperative day.

Twelve days postoperatively, the patient was readmitted with significant renal impairment, (creatinine 207) and a lactate of 8.6. The patient was returned to theatre on the 14th postoperative day and a large quantity of dark clot was identified anteriorly with an 'oozy' point discovered at the LIMA-LAD anastomosis. This was repaired with 6/0 prolene reinforced with pericardial pledgets. In the postoperative phase, renal replacement therapy was instituted, and a lower respiratory tract infection was managed with intravenous antibiotics.

On the 23rd postoperative day, clinical examination of the chest demonstrated evidence of sternal instability and deep sternal wound infection, which was treated with intravenous antibiotic therapy and a vacuum-assisted closure dressing. A good clinical response was observed and a long-term intravenous line was inserted to facilitate discharge on the 42nd postoperative day, completing intravenous antibiotics in the community.

After 8 months, satisfactory wound healing was complete; however, a protruding sternal wire prompted readmission for removal under general anaesthetic. The original wound was reopened, and all wires were removed. Sternal stability was confirmed and the wound debrided with the soft tissue edges undermined to facilitate primary closure. Two redivac drains were inserted into the flap space, and the wound was closed. Five hours post-surgery, the rate of drain output suddenly increased with 1800 ml recorded in 12 h. Exploration of the wound identified only small bleeding points. On the 3rd postoperative day, the skin flap became tense (Fig. 2). The patient was returned to theatre and once again further exploration identified bleeding from small vessels; however, in this instance, there was evidence of white clot formation. Fresh frozen plasma was administered along with one unit of platelets. Postoperative investigations identified factor VIII levels of 0.03 IU/ml; therefore, a diagnosis of moderate haemophilia A (0.01–0.05 IU/ml) was made. The patient was commenced on recombinant factor VIII, and with no further bleeding episodes, he was discharged on the 11th postoperative day.

On direct questioning, the patient admitted that he 'was a bit of a bleeder' particularly following previous tooth extractions. Detailed inspection of his recalled nephrectomy notes revealed unexpected intraoperative blood loss was observed, but this was never mentioned to the patient or investigated further. An



Figure 2: Prominent sternal skin, indicating a large collection.

Xq28 mutation was identified and on analysis of his family tree, of his 11 siblings, subsequent screening diagnosed his sister's grandson with mild haemophilia A, deducing that the patient's mother was a carrier.

Departmental analysis identified the lack of a historical record noting the unexpected bleeding during the patient's previous nephrectomy as a learning point. With the advent of electronic care record, all such information is readily discoverable. The importance of a comprehensive bleeding history at pre-assessment was reinforced, particularly in patients with a prolonged APTT.

## DISCUSSION

Preoperative diagnosis and implementation of a factor replacement protocol with continuous infusion and monitoring of levels throughout the perioperative period are key in managing the haemostatic challenges of open cardiac surgery in patients with haemophilia [2]. Intraoperative plasma factor levels can be easily measured before heparinization and after protamine sulphate administration; however, during cardiopulmonary bypass, this requires a chromogenic method.

A literature review by Rossi *et al.* concluded that good surgical outcomes are possible for patients with haemophilia, provided that a plan of action is in place [3]. Our case report is pertinent as this patient's haematological condition was identified only after a protracted recovery period, documenting the third reported case of cardiac surgery in undiagnosed haemophilia and the potential perioperative impact [4, 5].

Finally as detailed by the British Committee for Standards in Haematology, unselected preoperative coagulation tests are poor predictors of bleeding [6]. A structured bleeding assessment tool (BAT) [7] may be more efficacious at identifying patients warranting haematology referral for specific investigation. In our case, the preoperative APTT of 41.5 s suggested an abnormality; usually either a lupus anticoagulant or a factor VIII, IX or XI level of <40%. In such cases, it is important to appreciate the significance of a slight abnormality in APTT and utilize the above-mentioned tools or contact specialist haematologists.

## CONFLICT OF INTEREST STATEMENT

None declared

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## ETHICAL APPROVAL

No approval required.

## CONSENT

Signed patient consent for publication of case report and image gained.

## GUARANTOR

G.H. is the guarantor of this study.

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