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Ten-year study of postoperative complications following dental extractions in patients with inherited bleeding disorders

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Abstract. Dental extractions challenge the body's haemostatic mechanism. Postoperative bleeding from dental extraction can be prolonged, or even life threatening in patients with inherited bleeding disorders. Pre- and postoperative clotting factor replacements or systemic desmopressin (ddAVP) have been advocated at our institution to prevent bleeding complications in these patients. This study aimed to assess the postoperative bleeding rate in patients with inherited bleeding disorders that underwent dental extractions at our institution between 2003 and 2012. Patients with inherited bleeding disorders such as haemophilia A, haemophilia B, and von Willebrand's disease were included. Retrospective chart review was conducted. The result showed 53 extraction events occurred in 45 patients over the 10-year period. Ten out of 53 extraction events (18.9%) had postoperative bleeding requiring further factor replacement or ddAVP. Postoperative bleeding in one patient with mild haemophilia A was complicated by the development of inhibitors. Type and severity of bleeding disorder, bone removal, and use of a local haemostatic agent did not have any significant effect on postoperative bleeding. Despite the use of perioperative factors and desmopressin, the postoperative bleeding rates remain high for patients with inherited bleeding disorders. More studies are required to assess the safety and effectiveness of using local haemostatic control to achieve haemostasis following extractions.

Key words: haemophilia; von Willebrand disease; dental extraction; factor replacement; desmopressin.

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Dental extractions challenge the body's haemostatic mechanism. Postoperative bleeding from extraction sockets can be prolonged, or even life threatening in patients with inherited bleeding disorders. Haemophilia A, haemophilia B, and von Willebrand disease are the most common inherited bleeding disorders.

There have been no controlled trials to date to define the optimal haemostatic therapy for patients with inherited bleeding disorders undergoing oral surgery.

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Published data are based on retrospective series describing routine practice at single institutions[1–3]. The World Federation of Haemophilia published its second edition of guidelines for the management of haemophilia patients[4]. Dental extractions should be carried out with a plan for haemostasis management, in consultation with the haematologist; however, the guidelines did not specify if factor level should be increased with systemic therapy. They acknowledged the use of tranexamic acid or aminocaproic acid after dental procedures can reduce the need for replacement therapy, and that local haemostatic measures, such as oxidized cellulose and fibrin glue, may also be used whenever possible.

Traditionally at our institution, patients with inherited bleeding disorders undergoing dental extractions are admitted for perioperative systemic factor replacement or desmopressin (ddAVP) infusion depending on their haematological diagnosis. This approach can be time consuming, expensive, and limits patients to receiving extractions as an inpatient in hospital setting. If human-derived blood products are to be used, there are also the potential risks of viral and prion transmission. Of most concern among risks associated with factor replacement therapy is the development of immunoglobulin (Ig)G antibodies or inhibitors, which neutralize the already low level of endogenous clotting factors, making the patient prone to spontaneous bleeds and a challenge to achieve haemostasis in a trauma or surgery setting.

Practices at individual institutions can vary from the guidelines. A recent study based in the Royal Alfred Haemophilia Center in Victoria by Hewson et al.[5] suggested that no extra factor support in addition to the patient's usual prophylaxis was required for patients with inherited bleeding disorders undergoing dental extractions. In this study, an emphasis was placed on local haemostatic measures, which included the use of topical tranexamic acid and oxidized cellulose within the extraction sockets, careful surgical techniques, closure over sockets with sutures, and postoperative tranexamic acid mouthwash. Their postoperative bleeding rate was 8% (4 out of 50 patients) and all bleeding responded to replacement of factors or desmopressin.

Given the added cost and risks associated with perioperative factor/desmopressin replacement, one would expect a better outcome in bleeding complications after dental extractions for these patients. The objective of our study was to examine the complication rate at our institution for patients with inherited bleeding disorders undergoing dental extractions. We also aimed to identify factors that may be associated with increased risk of postoperative bleeding.

Materials and methods

All patients 18 years or older with haemophilia A, haemophilia B, or von Willebrand disease requiring one or more dental extraction treated at our institution during a 10-year period (January 2003 to December 2012) were included in our study. The patients' charts were reviewed and this included inpatient admission notes, maxillofacial and haematology outpatient progress notes, as well as any records on emergency department presentations. The following details were recorded:

- type of inherited bleeding disorder
- number of teeth extracted
- if removal of bone was required
- if sectioning of teeth was required
- if haemostatic agent was placed in the socket
- pre- and postoperative haemostatic therapy prescribed, including intravenous, oral or topical therapies
- postoperative bleeding or other complications.

These variables were then examined to see if they were significantly associated with increased postoperative bleeding.

All procedures were performed by a maxillofacial surgery trainee or a consultant. If performed by a trainee, an experienced maxillofacial surgery consultant was either scrubbed or present in theatre. All patients were treated as inpatients with at least an overnight stay. The majority of patients were treated under general anaesthesia. These precautionary measures were taken, as this allows for monitoring of any immediate postoperative bleeding and better support in terms of medications, recombinant factors, and personnel, if significant bleeding was to occur.

Statistical methods

The types of bleeding disorders are divided into nine groups: haemophilia A – mild, moderate, or severe; haemophilia B – mild, moderate, severe; and von Willebrand disease – types 1, 2, and 3. Mild haemophilia is defined by a factor level above 5%. Moderate haemophilia has a factor level between 1% and 5% and severe haemophilia is when the factor level is less than 1%. The number of teeth extracted was classified into single tooth extractions or multiple teeth extractions.

The potential association between the outcome (postoperative bleeding requiring treatment other than applying pressure) and the risk factors were explored, firstly, using univariate logistic regression. Then with significant variables, a multivariate logistic regression was performed with an Akaike information criteria-based covariate searching method. The significance level was set to be $P < 0.05$. R (version 3.1.1; https://cran.r-project.org) was used for data management and statistical analysis.

Results

A total of 57 extraction events occurred in 49 patients during the study period. Four extraction events in four patients were excluded from the study as their charts had been destroyed or were missing, making a total of 53 extraction events in 45 patients. The types of inherited bleeding disorder are presented in Table 1. There were two patients with severe haemophilia A who are on regular three times weekly prophylactic factor VIII replacements. Inhibitor screens were performed on these two patients preoperatively to ensure there would be an adequate response to factor VIII perioperatively. The remaining patients were not on any regular prophylaxis. Inhibitor screens were not performed on these patients as they were at low risk of developing inhibitors without exposure to factor VIII followed by a clinical alteration to their bleeding tendency.

The male to female ratio was 36:9. A male predominance was expected as haemophilia has an X-linked inheritance. Of the intraoperative variables, 22.6% of patients had a single tooth extraction, 58.5% required bone removal, and 49% of patients had local haemostatic agents placed in the extraction socket. Local haemostatic agents used were Gelfoam® (Pfizer), Surgicel® (Ethicon, Johnson-Johnson Corporation), or Floseal® (Baxter International Inc.). The decision to use

Table 1. Distribution of types of inherited bleeding disorder in 45 patients.

Haemophilia A			Haemophilia B			Von Willebrand disease		
Mild	Moderate	Severe	Mild	Moderate	Severe	Type 1	Type 2	Type 3
18	0	2	9	0	0	13	3	0