

Bleeding history

Recommendations of the working group on Perioperative Coagulation of the ÖGARI

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The aim of the preoperative clarification is to detect coagulopathies and to minimise the perioperative risk of bleeding using a targeted therapeutic approach. Therapeutic regimens within internal medicine increasingly include medications affecting coagulation, which can lead to a considerable increase in intra- and postoperative bleeding tendencies. This risk must be identified preoperatively and - in cooperation with primary physicians, internists, and surgeons – it must be considered perioperatively. Routine preoperative clarification involves the use of standard tests for plasma coagulation, such as Quick time [thromboplastin time (“prothrombin time”, PT)] and activated partial thromboplastin time (aPTT), as well as platelet count, although numerous studies since 1978 have called into question the utility of these coagulation screening methods in adults and children [2, 6, 8, 9, 10, 12, 15, 19, 21, 26, 27]. This paper will present the evidence for a considerably more reliable strategy for preoperative patient management: the preoperative evaluation of bleeding history. Whether and to what extent additional standard lab tests are needed [5, 13, 15] should be based on the findings of the bleeding history.

Gaps in the standard coagulation tests

Standard tests for plasma coagulation [activated partial thromboplastin time (aPTT), international normalised ratio (INR), platelet count, and fibrinogen level] essentially assess plasmatic haemostasis only. Normal findings do not rule out the risk of haemorrhagic diathesis, but instead create a sense of false security. However, from an epidemiological standpoint, the most common coagulopathies affect platelet function and/or the von Willebrand factor (VWF; [9, 15, 20, 22, 27]). Standard tests for coagulation are conducted in plasma and thus do not test the cellular components of haemostasis. The low accuracy of standard lab tests for coagulation in detecting an increased perioperative risk of bleeding has been well documented.

Rationale for compiling a standardised bleeding history

The enormous significance of bleeding histories with respect to identifying disorders of platelet function and the von Willebrand syndrome (VWS) based on standardised questionnaires was underscored in a current review by Lillicrap et al. [18]. In July 2006 the working group on paediatric anaesthesia of the German Society of Anaesthesiology and Intensive Medicine (DGAI) together with the German Society for Ear-Nose-Throat Medicine, Head and Neck Surgery (DGHNOKC) as well as the Society for Thrombosis and Haemostasis Disorders (GHT) published a recommendation on preoperative screening [25]. This current recommendation is essentially based on the results of preoperative clarifications prior to adenotomies and tonsillectomies in children [6]. A routine lab evaluation is only requested if the case history is positive. This lab evaluation should also identify combined plasma cell and primary haemostatic disorders, such as VWS.

The enormous significance of compiling a standardised bleeding history using a structured questionnaire has been well documented in a series of papers on preoperative risk clarification. In the most recent paper on this topic, Koscielny et al. [15] measured platelet function analyzer (PFA)-100 “closure times” (device for the global assessment of platelet and VWF function) in addition to standard bleeding histories and standard tests for coagulation. The predictive value of specific, anamnestic questions to identify impaired haemostasis capable of being measured with lab tests was described for 5649 adult patients. This study called into question the meaningfulness of conducting preoperative standard plasma-based coagulation tests based on confirmation of epidemiologically more common cases of impaired platelet function [15]. Moreover, aPTT prolongations with no other simultaneous bleeding symptoms are often caused by a Lupus anticoagulant, which is not usually associated with a bleeding tendency, but rather an increased thrombosis tendency [15]. Operations delayed in error can have serious organisational and economic consequences. The possible savings from standard diagnostic tests for coagulation in Germany has been estimated at 14.2 million Euros annually [15]. In addition, Koscielny et al. point out the significance of making a general assessment of the patient because bleeding symptoms, for example (especially in the case of negative standard tests for coagulation and other diagnostic procedures) were attributable to concomitant illnesses (epistaxis-associated hypertension, periodontitis associated with bleeding gums, uterus myomatosis, or liver cirrhosis associated with menorrhagia; [14, 16]).

These results point to the necessity to introduce a uniform, standardised method for the preoperative compilation of a bleeding history for use in requesting targeted tests for coagulation, which will also gauge primary haemostatic function. The questionnaire introduced here by the working group on perioperative coagulation of the Austrian Society of Anaesthesia, Resuscitation and Intensive Care serves to gauge risk and optimise patient management while reducing perioperative transfusion requirements. However, there will still be a residual risk of overlooking potentially dangerous, haemorrhage-related pathological symptoms in cases of normal bleeding histories. Such cases can only be treated symptomatically and on a case-by-case basis once the bleeding has occurred.

Which disorders of haemostasis should be preoperatively identified?

In principle, relevant disorders of haemostasis include those that are common, as well as those which, although rare, can cause massive blood loss during and after an operation. Typical signs of bleeding for the most common inherited disorders of the coagulation system (VWS) are epistaxis (63%), menometrorrhagia (60%), prolonged bleeding after tooth extraction (52%), haematomas (49%), prolonged bleeding from wounds (36%), bleeding gums (35%), postoperative bleeding (28%), postpartum bleeding (23%), gastrointestinal bleeding (14%), haemarthrosis (8%), haematuria (7%).

Compiling the bleeding history

The preoperative compilation of the bleeding history must take place *early on* in order to allow time for additional lab evaluations with appropriate measures. If an event associated with bleeding should occur between the compilation of the bleeding history and the procedure/operation, then the patient must be re-evaluated.

1. In principle, the bleeding history should be compiled by an experienced anaesthetist (specialist standard) as part of the pre-anaesthesia interview. Though a lucid patient (or patient's legal guardian) should be very capable of filling out the left section of the case history questionnaire independently, the interviewing physician is obligated to validate the accuracy of the responses.
2. An increase in time and effort spent on the case history correlates to improved perioperative patient management. Hospital carriers must provide adequate personnel to ensure that the pre-anaesthesia interview is conducted as described here. Our questionnaire represents a modification of the bleeding history questionnaire of the Landeskrankenhaus, Feldkirch [Feldkirch State Hospital], which has been in clinical use since 1996 and is based on validated individual questions found in the current literature [1, 3, 4, 7, 11, 15, 24].
3. The time required by the interviewer can be between 2 and a maximum of 10 minutes per questionnaire (depending on the number of positive responses given for each possible coagulopathy) and medical examination [16]. Experience-based times for the practical implementation of the interview can be submitted to georg.pfanner@lkhf.at.

The questionnaire

The questions need to be phrased in a way that the patient can both understand and answer adequately. The bleeding history is considered abnormal if the patient responds to at least one of the questions with "yes" and the relevance of the response is confirmed by the anaesthetist during the course of the interview (right column). The bleeding case history is considered normal if the response to all of the questions is "no". The contents of each question are detailed below; Each percentage refers to the predictive value for the identification of impaired haemostasis capable of being measured with lab tests [15, 24]. Numbering of questions refers to the publication in: *Anaesthesist*. 2007; 56: 604-11.

Question 1a: Nose bleeds (40 – 50%)

A clinically predictive finding for the presence of a coagulopathy is a nose bleed (epistaxis) without trauma, without mechanical manipulation ("nose picking", blowing the nose forcefully), without infection, and regardless of whether or not it is heating season. This pathognomonic form of mucosal bleeding is a strong sign for the presence of a disorder of primary haemostasis. Medication regimens that negatively affect platelet function, such as aspirin, can unmask a previously asymptomatic case of VWS with this symptom. Patients with nose bleeds occurring on one side only should undergo an ENT examination (to rule out an ENT-related cause for the epistaxis, such as Kiesselbach's plexus or deviated septum). Nose bleeds that occur only during

infections of the upper respiratory airways or seasonally (for example, rhinitis) are most likely not caused by a disorder of haemostasis. In cases of severe arterial hypertension the occurrence of epistaxis correlates with blood pressure peaks in the morning. If the patient's long-term medication regimen does not include any medications affecting coagulation, then a disorder of haemostasis is unlikely. Hypertension should be controlled prior to an operation.

Question 1b and 1c: Bruises or punctiform bleeding (68%) and/or haemarthrosis (90%)

Clinically predictive findings for the presence of a coagulopathy include cumulatively occurring haematomas or also other signs of bleeding on the torso or at sites not typically susceptible to mechanical impacts. This can be a sign for the presence of disorders of primary haemostasis, e.g. medication-induced, organ-associated, inherited, or VWS-related.

Haemarthroses (question 1c) since childhood and a tendency toward haematomas can be caused by a severe reduction in factor VIII or factor IX or a severe case of VWS (e.g. type III) and require appropriate clarification. Hyperactive children often present haematomas on the extremities due to external impacts and these are not considered to be signs of abnormal bleeding.

Question 2 and 3: Secondary bleeding from cuts, scrapes, and tooth extraction (40 – 60%)

It is imperative that secondary bleeding from minor injuries is delineated through targeted questioning. Secondary bleeding is considered definitively prolonged if – for example, after a wet shave – a cut bleeds continuously or repeatedly after 5 min. (and without mechanical irritation). Especially severe or prolonged secondary bleeding during teething in children or following tooth extraction, like mucosal bleeding, is a highly suspicious sign of the presence of a disorder of primary haemostasis or haemophilia. Tooth extraction is considered to be a bleeding challenge. If the patient has undergone a tooth extraction without any bleeding complications, then a bleeding tendency can be ruled out for now. However, a patient having undergone a tooth extraction many years ago without any bleeding complications does not necessarily rule out the possibility of the patient having developed an acquired coagulopathy in the ensuing period, e.g. medication-induced or organ-associated disorders of platelet function.

Bleeding gums were not included as a symptom in the questionnaire due to the high prevalence of periodontitis. Usually this type of bleeding is not attributable to any type of coagulopathy (predictive value < 40%).

Question 4: Severe bleeding during or after operations (40 – 53%)

The question about severe bleeding during or following operations is often not easy to answer. Many patients can only report that they received a blood transfusion in connection with their operation. In such cases, making contact with the previous physician or gaining access to earlier hospital records can provide clues. In the case of transfusions of erythrocyte concentrates, a specific search should be made for the typical volume for each procedure. There should also be a focus upon cases of bleeding following operations, in which an unknown bleeding tendency became symptomatic: these include minor surgical procedures, such as adenotomies, tonsillectomies, operations involving the nose and paranasal sinuses, as well as circumcisions. These kinds of minor operations are considered especially significant for a diagnosis.

Question 5: Impaired healing of wounds (40%)

Due to the fact that blood coagulation is an integral part of wound healing, disorders of haemostasis can result in impaired healing. Typical symptoms include wounds that are still weeping and/or gaping several days later (with typical wound care) or excessive healing with formation of keloid. The question regarding the healing of wounds can be relevant for identifying a factor XIII deficiency. A case of recurrent bleeding even after several days is a highly suspicious sign for the presence of a qualitative or quantitative factor XIII deficiency. If this is the case in a child, then the interviewer should inquire about any prolonged bleeding from the navel after the umbilical cord was cut immediately following delivery. Infection-related healing disorders are to be ruled out through a differential diagnosis.

Question 6: Family history (79%)

The compilation of a case history for first-degree blood relatives is decisive – especially in the case of children, adolescents, and young adults. The shorter a person has lived, the lower the

exposure to bleeding risks (operations, accidents etc.), making it all the more important to refer to the case history of a patient's blood relatives as well. A case-specific clarification should be conducted in cases of abnormal family history.

Question 7a and b: Anticoagulant medications (60 - 70%)

It is very important to ask targeted questions about substances, which could be associated with a bleeding tendency. Patients are often not aware that certain substances are in fact anticoagulants and will not report them as such unless specifically asked. These include prescriptions, but much more commonly over-the-counter pain medications and possibly herbal medicines (migraine and headache remedies). The interviewer should ask specifically about herbal medicines because these can cause anaesthesia-related side effects and, as a result, should be discontinued prior to an operation [17]. Conversely, some substance classes with possible side effects on coagulation, such as antibiotics, are unavoidable in the perioperative phase.

Question 8: Menometrorrhagia (55 – 65%)

Ongoing hypermenorrhea since menarche is considered a highly suspicious sign for inherited VWS [7, 11]. But secondary cases of hypermenorrhea must first be assessed. Here, any gynaecological causes must always be ruled out (myomas, menstrual disorders etc.).

Conclusions

In accordance with the currently available literature a standardised bleeding history is superior to a broad screening with the assessment of standard coagulation parameters in preoperative risk clarification.

By using a questionnaire it should be possible to identify even the most common disorders of platelet function and VWS. Direct cost-saving benefits can be achieved through targeted requests for lab tests in the case of a positive bleeding history.

Whether or not medications affecting coagulation should be discontinued depends on the risk-benefit relationship of each individual patient and should be based on an interdisciplinary approach.

Finally, perioperative coagulation complications should be reduced. This will contribute to the more economical use of homologous blood products and plasma derivatives and could lower overall treatment costs.

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