Routine preoperative coagulation tests: are they necessary?

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Outline

➢ Introduction.
➢ Brief review of hemostatic mechanisms.
➢ A clinical aspect of Bleeding risk.
➢ Preoperative Assessment of Hemostasis.
➢ Controversy re the role of routine pre-op screening for bleeding disorder.
➢ Preliminary result of local study
Introduction

- Hemostasis has three phases.
  - Primary hemostasis (platelet plug)
    Platelets, blood vessel endothelium, and vWF
  - Secondary hemostasis (coagulation)
  - Fibrinolytic.
Haemostasis overview:

- BV Injury
- Platelet Aggregation
- Platelet Activation
- Blood Vessel Constriction
- Coagulation Cascade
- Neural

Primary hemostatic plug:
- Reduced Blood flow
- Platelet Activation

Stable Hemostatic Plug
- Fibrin formation
Disorders of Hemostasis

Vascular disorders •
Scurvy, easy bruising, —

Platelet disorders •
Low Number or —
abnormal function

Coagulation disorders •
Factor deficiency. —

Mixed/Consumption: •
DIC
Clinical aspects of bleeding

- Evaluation of patients with bleeding is a multi-step process:
  - Complete history
  - Detailed physical exam
  - Laboratory evaluation

CBC, PTT, PT, INR
Diagnostic Issues

- PT/PTT
  - Not predictive
- Most common cause prolonged PTT is FXII, APL.
- Platelet count: Quality vs Quantity.
- Specific factor assays-Hematology consult.
- Normal physiology variation.
Normal Coagulation Function in Infants

- Coagulation assessment is much more complex in infant

- Most factors are low at birth
  - 20-30% adult levels of Vitamin K dependent factors
  - other factors: fibrinogen and factors V, VIII and XIII, are increased at birth compared with adults

- full-term neonate has usually acquired good protection against hemorrhage

- low levels of plasminogen
  - Balance between clotting and fibrinolysis is in favor of clotting

- aPTT is not a reliable test to assess the haemostatic status of neonates.

*Paediatric Anaesthesia* 2002
TO BLEED OR NOT TO BLEED?
IS THAT THE QUESTION FOR THE PTT?
Routine preoperative tests

• The purpose of widespread testing:
  • to evaluate a known clinical condition
  • to identify patients at high risk.
  • to screen patients for new disease that may affect perioperative morbidity.

• Studies have shown that 60% of routine screening examinations could be eliminated without adversely affecting patient care.
Routine preoperative tests

- Preoperative routine testing before elective surgery began 40 years ago.

- Adenotonsillectomy is one of the most common major surgical procedures performed in children.

- Bleeding complications after adenoidectomy (AE) less than 1% & tonsillectomy (TE) about 3%.
Bleeding Risk

• Unselected coagulation testing is widely practiced to assess bleeding risk prior to surgery.

• This may delay surgery inappropriately.

• Cause unnecessary concern in patients who are found to have ‘abnormal’ tests.

• Associated with a significant cost.

• Coagulation test very poor predictive value for bleeding risk.
Cost-effective approach for preoperative hemostatic assessment in children undergoing adenotonsillectomy

- Craig S. Dakery @2000 published large series, showing efficacy of selective screening.
- 6 years Retrospective review.

1750 all screened
22 bleeds (2.3%)
all normal coag

2624 selective screened
16 (0.66%)
8 patient abn PT,PTT
8 patient nor.

They conclude: coagulation test should be done at selected patient after careful questionnaire and physical examination.

They are other factors than coagulopathy cause bleeding (Surgical technique, hydration, infection).
Significance and causes of abnormal preoperative coagulation test results in children

A. SAMKOVÁ,* J. BLATNÝ,† V. FIAMOLI,† P. DULÍČEK‡ and E. PAŘÍZKOVÁ*

A total of 274 consecutive paediatric patients were tested for abnormal preoperative coagulation tests in two university hospitals in the specified 1-year period. Elective ENT surgery was the most frequent reason for the tests.
conclusion

- The majority of abnormal findings in aPTT and PT appeared only transiently.

- This findings provide supportive evidence for the current recommendation:
  
  laboratory coagulation screening should be performed only in patients with positive family and/or personal bleeding history.
recommendations of the AAO-HNS 1999 consensus statement.

- PT and PTT should be ordered preoperatively if the history or physical examination suggests a coagulation disorder.... the questionnaire to assess for bleeding disorders

1. Has the patient ever bled for a prolonged period of time after biting the tongue, cheek, or lip?
2. Does the patient develop spontaneous bruises >4-5cm diameter?
3. Has the patient experienced prolonged bleeding after minor surgical procedures (circumcision, skin biopsy, dental extractions)? Has bleeding recurred 24 hours after cessation of hemorrhage?
4. What medications has the patient taken in last 10 days? ASA?
5. Any blood relatives with any known bleeding disorder? Anyone required blood transfusion?
6. Any systemic medical disorders (lupus, liver or kidney disease)?
Summary of key recommendations

1 Coagulation screening prior to surgery or other invasive procedures to predict postoperative bleeding in unselected patients is not recommended. (Grade B, Level III)

2 A bleeding history including detail of family history, previous excessive post-traumatic or postsurgical bleeding and use of anti-thrombotic drugs should be taken in all patients preoperatively and prior to invasive procedures. (Grade C, Level IV).

3 If the bleeding history is negative, no further coagulation testing is indicated. (Grade C, Level IV).

4 If the bleeding history is positive or there is a clear clinical indication (e.g. liver disease), a comprehensive assessment, guided by the clinical features is required. (Grade C, Level IV)
Local study

• coagulation screening tests were performed routinely in all Paediatric patients.

• **The aim of this study** was to evaluate benefit of preoperative coagulation screening tests in children.

• We retrospectively analyzed laboratory and clinical data of children came for elective surgery. (Feb 2014-January 2015)

• **Exclude:** known bleeding disorder
  over 15 years old
  oncology patient
### Table 1. Demographic and clinical data

**Characteristic:**

<table>
<thead>
<tr>
<th>Age</th>
<th>Count (Percentage)</th>
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<tr>
<td>0 to &lt; 1</td>
<td>161 (7.7%)</td>
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<tr>
<td>1 to &lt; 8</td>
<td>1228 (58%)</td>
</tr>
<tr>
<td>8 to &lt; 15</td>
<td>550 (26.4%)</td>
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Mean (year): 5.9  
Median (year): 5.0

**Gender:**

- Male: 1332 (64%)
- Female: 746 (35%)
<table>
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<tr>
<td>PGSx</td>
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<td>Plastic</td>
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<tr>
<td>OMFSx</td>
<td>54</td>
</tr>
<tr>
<td>Endoscopy</td>
<td>31</td>
</tr>
</tbody>
</table>

**Result**

**total** **2,078 (2,500)**

- **Repeated test** 416
- **No coagulation pre Sx** 61
- **post surgery bleeding**
  (normal coag.)
  2 due to surgical cause

**M:F 2:1**
2078 Patients

- 77 Patients with abnormal screening
  - 15 Patients Normal Screening on repeat testing
  - 52 Patients Repeatedly abnormal screening
    - 7 Patients with abnormal bleeding disorders
      - 2 vWd
      - 2 LA
      - 1 XI
      - 2 XII
  - 45 patients with normal factors
- 61 Patients without pre-operative screening
  - 1 patient with Post-operative bleeding due haemophilia A
- 1940 Patients with normal Screening
  - 2 Cases with Post-operative bleeding due to surgical causes
  - No post operative BL
Evaluating the risk of excessive bleeding before low risk surgery

Positive personal and/or family history of bleeding or physical evidence?

NO

- No Testing Required

YES

- PT, aPTT, Platelet count
  
  Normal
  
  - No additional testing
  
  Abnormal
  
  - Consult Pathologist for specific assays
Take home massage

- Family and personal bleeding history can replace routine coagulation tests in preoperative screening.

- Coagulation testing should be performed only in patients with positive bleeding history.

- PT & PTT are diagnostic test for inherited bleeding disorder, but were not intended as screening test.
Thank you!
Azzh al zahrani
• The main purpose of preoperative investigations is to provide additional diagnostic and prognostic information to supplement the clinical history of a patient with the aim of:
• using this information to reduce the possible harm or increase the benefit to patients by altering their clinical management if necessary; predicting postoperative complications;
BLEEDING DISORDERS

• most common coagulation defects in the general population are von Willebrand's disease
• Von Willebrand’s disease affects 1% of the general population.
• autosomal dominantly with variable expression.
• Type 1 is the most common (80-90%)
• Elevated PTT, bleeding time, and decreased/absent vWF antigen are diagnostic for this disease.
• Many commonly used medications cause platelet dysfunction; ASA and Plavix should be discontinued one weeks prior to surgery, naproxen 4 days prior, and all other NSAIDS for 3 days.
Routine coagulation tests in newborn and young infants

- The diagnostic approach to haemostatic defects in the newborn is challenging and requires appropriate interpretation of coagulation tests.

- The hemostatic system in the newborn undergoes a dynamic development and reaches full maturity only after 6 months of age.

- Study designed to investigate 1758 results available from newborns aged from 0 to 20 days postnatal the development of the human coagulation system in newborn infants and to develop appropriate reference ranges for (PT), (APTT) and fibrinogen (FBG) (days 1, 2, 3, 4, 5, 6, from 7 to 10 and from 11 to 20).

- The mean APTT and PT value was still higher than the upper limit of the adult reference range in infants aged between 11 and 20 days.

- Adult reference ranges for coagulation screening tests, especially PT and APTT, cannot be applied to newborns and young infants.

Preoperative Coagulation Study Prior to Tonsillectomy
from Cincinnati & New York medical center

Christopher J. MD Robert J MD

- The safest workup for pediatric tonsillectomy include determination of Hb and platelet level. Unless family history or personal history is suggestive no other laboratory tests are required.
Coagulation testing has been considered especially important in paediatric surgical practice where patients may not have been exposed to any prior haemostatic challenge.

The published data considered in this guideline indicate that an unstructured bleeding history is not a good predictor of postoperative bleeding (Grade B, level III). There are indications that a structured approach may be predictive. Therefore there is insufficient evidence to conclude that the bleeding history has no PV for postoperative bleeding. A bleeding history, including family history, evidence of excessive post-traumatic or postsurgical bleeding and use of antithrombotic drugs should be taken in all patients prior to surgery or invasive procedures. (Grade C, Level IV).
The Preoperative Evaluation Clinic

The successful development and implementation of a preoperative evaluation clinic (PEC) seeks to do the following:

- (1) decrease surgical morbidity;
- (2) minimize expensive delays and cancellations;
- (3) evaluate and optimize patient health status;
- (4) facilitate the planning of anesthesia;
- (5) reduce patient anxiety through education;
- (6) obtain informed consent.
Preoperative coagulation screening for adenotonsillectomy: *A review and comparison of current physician practice.*
Aaron Wieland, MD,

- In 1999 the American Academy of Otolaryngology–Head and Neck Surgery issued the Clinical Indicators of coagulation and bleeding work-up only if there were an “abnormality suspected or genetic information unavailable.
- to determine the current practice of preoperative coagulation screening among pediatric otolaryngologists in otherwise healthy children undergoing tonsillectomy or adenotonsillectomy.
- A five-question survey was designed to document current hematologic and coagulation screening practice.
- The questionnaire was sent to two separate groups: members (ASPO) and members of the Massachusetts Society of Otolaryngology–Head and Neck Surgery (MSO-HNS).
Result

- patients with no known bleeding risk, 21% continue to obtain coagulation screening.

- MSO-HNS respondents reported ordering more preoperative coagulation studies than did ASPO respondents (35% vs 10%).

- The survey results indicate a discrepancy between current practice relative to pre-adenotonsillectomy coagulation screening and the recommendations of the AAO-HNS 1999 consensus statement.