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BSH GOOD PRACTICE PAPER

Haematological evaluation of bruising and bleeding in children undergoing child protection investigation for possible physical maltreatment: A British Society for Haematology Good Practice Paper

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Methodology

This Good Practice Paper was compiled according to the British Society for Haematology (BSH) process available at: https://b-s-h.org.uk/media/16732/bsh-guidance-development-process-dec-5-18.pdf.

The BSH produces Good Practice Papers to recommend good practice in areas where there is a limited evidence base but for which a degree of consensus or uniformity is likely to be beneficial to patient care. Due to the paucity of high-quality evidence, the Grading of Recommendations Assessment, Development and Evaluation (GRADE) nomenclature (http://www.gradeworkinggroup.org) was not used to assess the strength of the recommendations.

Literature review details

A literature search was performed on 26 January 2021 and included searches of MEDLINE (using PubMed), EMBASE (using Ovid) and the Cochrane library databases. Details of the search can be found in Appendix S1. References known by the authors were also included and references from relevant publications were searched. Due to the paucity of published data all types of publication, including editorials, case reports and conference abstracts, were included. Those relating to non-human studies, adult studies and published in non-English journals were excluded.

Review of the manuscript

The writing group produced the draft guideline. Review of the manuscript was performed by the BSH Haemostasis and Thrombosis Task Force, the BSH Guidelines Committee and the BSH sounding board. It has been supported by The Royal College of Paediatrics and Child Health (RCPCH) Child Protection Standing Committee. It has also been reviewed by the United Kingdom Haemophilia Centre Doctor's Organisation, Family Justice Council and the National Network of Designated Healthcare Professionals for Safeguarding Children; these organisations do not necessarily approve or endorse the contents.

INTRODUCTION

The aim of this Good Practice Paper is to advise on haematological evaluation of bruising and bleeding in children undergoing child protection investigation for possible physical maltreatment; to consider which children should undergo investigations, which tests are indicated, the interpretation and reporting of abnormal results, multi-disciplinary working, and the contribution of healthcare professionals to statutory child protection proceedings and to court proceedings.

The guidance has been written to assist haematologists, paediatric haematologists, paediatricians, and laboratory scientists to achieve an informed and consistent approach that supports accurate diagnosis and exclusion of bleeding disorders, reduces unnecessary testing and supports safety planning for this group of children and young people. Inadequate evaluation has the potential to miss a significant bleeding disorder diagnosis or overlook a diagnosis of physical abuse, whilst extensive testing, sometimes on the advice of court appointed medical experts and not always clinically indicated, can result in unnecessary venepuncture, false positive results, and potentially erroneous diagnoses. Pre-analytical problems and physiological variation is frequent, particularly in younger children, and can lead to difficulties in the accurate interpretation of test results. Inaccurate diagnosis and inconsistent clinical management can pose difficulties for safe decision-making in court proceedings.

DETERMINING THE NEED FOR LABORATORY INVESTIGATIONS

Many children presenting with soft tissue injury do not require blood investigations. The decision to investigate is a matter of clinical judgement and is a decision for the treating clinician.[1] Table 1 describes examples of clinical presentations where haematological investigations are not likely to be required although this is not exhaustive. The purpose of haematological investigation when physical maltreatment is suspected in a child presenting with bruising or bleeding, is to identify or exclude the presence of an inherited or acquired bleeding disorder that may have influenced the propensity to bruising/bleeding. Competent assessment of a child aims to differentiate injuries suggestive of physical maltreatment from findings that may be normal for the developmental stage of the child and from bruising/bleeding associated with an underlying bleeding disorder.

In the context of children presenting with bleeding at a critical site, particularly intracranial haemorrhage (ICH), haematology expertise is relied on to distinguish a contributory/causal underlying bleeding disorder from a secondary coagulopathy occurring as a consequence of the haemorrhage.

An important caveat is that physical maltreatment and bleeding disorders can co-exist in the same child. In addition, no single panel of tests definitively rules out a bleeding disorder diagnosis.

TABLE 1 Examples of clinical presentations that are NOT LIKELY to require haematological investigations

A child in whom a diagnosis of probable accidental injury is made and there is no clinical suspicion of an underlying haemostatic disorder
A child who has bruising that carries the imprint of a hand, ligature or implement
An independently mobile child with no previous history of bruising with minor trauma from an early age and no clinical suspicion of an underlying haemostatic disorder
A single bruise on the ears, neck, cheeks, eyes, or genitalia in a fully mobile child with no clinical suspicion of acquired haemostatic disorder
A history of major haemostatic challenge with no excessive bleeding (e.g., tonsillectomy) and no clinical suspicion of acquired haemostatic disorder, e.g., widespread petechiae, bruising and/or mucosal bleeding
Physical findings on examination consistent with a clear medical diagnosis: lesion not the result of inflicted injury, e.g., congenital dermal melanocytosis, congenital melanocytic naevi, striae

Important features of the clinical history and examination

Evaluation of the need for haematological investigation involves assessment of the personal and family history of bleeding, the age and developmental stage of the child, any accounts provided of accidental trauma, and the examination findings.

A bleeding history is important to identify those who may have an inherited bleeding disorder (IBD). A structured bleeding history should explore mucocutaneous bleeding symptoms (e.g., epistaxis, gum bleeding, prolonged bleeding from minor wounds, menorrhagia, gastrointestinal tract bleeding), bleeding in relation to previous haemostatic challenges (e.g., surgery, dental extractions, trauma) and, in the case of younger children, bleeding during the neonatal period (e.g., cephalohaematoma, prolonged umbilical stump bleeding, bleeding from Guthrie heel prick or immunisation sites) and bruising with minor trauma from an early age. A standardised bleeding assessment tool, e.g., the International Society for Haemostasis and Thrombosis Bleeding Assessment Tool (ISTH-BAT), can be used to quantitate bleeding symptoms in order to generate a bleeding score. The presence of multiple bleeding symptoms and/or severe bleeding symptom(s) contribute to a higher score and therefore a greater chance of a bleeding disorder diagnosis. The ISTH-BAT has been shown to improve pre-test probability in the investigation type 1 of von Willebrand disease in adults but has not been validated in the setting of child protection investigations.[2]

Family history of significant bleeding symptoms and/or an IBD diagnosis may be relevant, along with a history of parental consanguinity as rare IBDs are often recessively inherited. The limitations of a positive family history should however be noted and even in boys with severe haemophilia A only 50% of new diagnoses have a positive family history.

An acquired bleeding disorder usually presents with a recent onset of unexplained haemorrhagic symptoms. Thrombocytopenia, due to immune thrombocytopenia (ITP) or a bone marrow disorder may present with widespread petechiae, bruising and mucosal bleeding. The possibility of medication-related coagulopathy is elicited from the medication history, which should also identify the neonatal administration of vitamin K; deficiency of the latter can present as vitamin K deficiency bleeding (VKDB), which occurs in babies aged from birth to 3 months and can cause bruising and significant gastrointestinal or ICH.[3]

Clinical examination should include a detailed assessment and documentation of bruising along with examination for any current or recent mucosal or concealed bleeding. As the frequency and nature of normal bruising, along with the likelihood of sustaining injury, varies with the degree of mobility, the developmental stage of the child should be assessed. In relation to non-haematological causes of increased propensity to bruising such as Ehlers Danlos syndrome and osteogenesis imperfecta, clinical examination findings of collagen disorders should be sought, including blue sclerae, abnormal dentition, short stature, dysmorphic facies, increased skin and joint laxity and atrophic scars.[4] Further consideration of these conditions lies out with the scope of this document.

Children presenting with bruising

Several studies have sought to identify features that can help to differentiate abusive bruising from accidental bruising in normal children and children with IBDs.[5–9] Specific anatomical sites that are more likely to be associated with abuse include bruising to the buttocks, cheeks, ears, neck, and the front of the trunk or thighs. This contrasts with bruising over bony prominences, particularly the lower legs and a T-shaped facial distribution, which is commonly seen in accidental injury in mobile children, including those with IBDs.[8,10] Petechiae and linear bruising patterns and bruising in pre-mobile children are also more likely to be features of physical maltreatment.[6,11] While children with IBDs have more and larger bruises than usual at all developmental stages, bruises affecting the ears, neck, cheeks, eyes and genitalia remain uncommon.[7,12]

Children presenting with bleeding at a critical site

The possibility of a bleeding disorder should be considered in all children presenting with unexplained bleeding at a critical site in the setting of suspected physical maltreatment, particularly ICH but also gastrointestinal bleeding, retinal bleeding,[13] intraspinal bleeding and haemarthrosis.

Intracranial haemorrhage, particularly subdural bleeding, presenting in infancy beyond the neonatal period is most often due to abusive head trauma.[14] However, this time period overlaps with the age group most likely to present with ICH secondary to an IBD and is also the age at which VKDB may present. While IBDs are rare in the general population failure to make a prompt diagnosis may result in a significant treatment delay and poorer outcome.

Spontaneous ICH in IBDs is uncommon and usually, but not exclusively, occurs in children with a severe bleeding disorder, the most common being severe haemophilia A.[15,16] Factor XIII deficiency is a rare IBD but is associated with a high risk of ICH, which is estimated to occur in around one-third of cases in the absence of preventative treatment. Bleeding that is out of proportion to a reported account of head trauma, or bleeding at a critical site can be the first presentation of an IBD.

Recommendations

- **No laboratory investigations are required in the majority of cases who present with bruising, particularly older children.**
- **Consider laboratory investigations when:**
  - **There is bruising in a pre-mobile child.**
  - **There is unusual bruising pattern and/or bleeding that is out of proportion to the purported mechanism.**
  - **There is bleeding at a critical site (e.g., ICH, retinal haemorrhage, gastrointestinal haemorrhage, intraspinal haemorrhage, haemarthrosis) with no correlating history of trauma or other explanation that adequately accounts for the bleeding.**
  - **There is suspicion of coagulopathy from the personal history, family history and/or examination.**

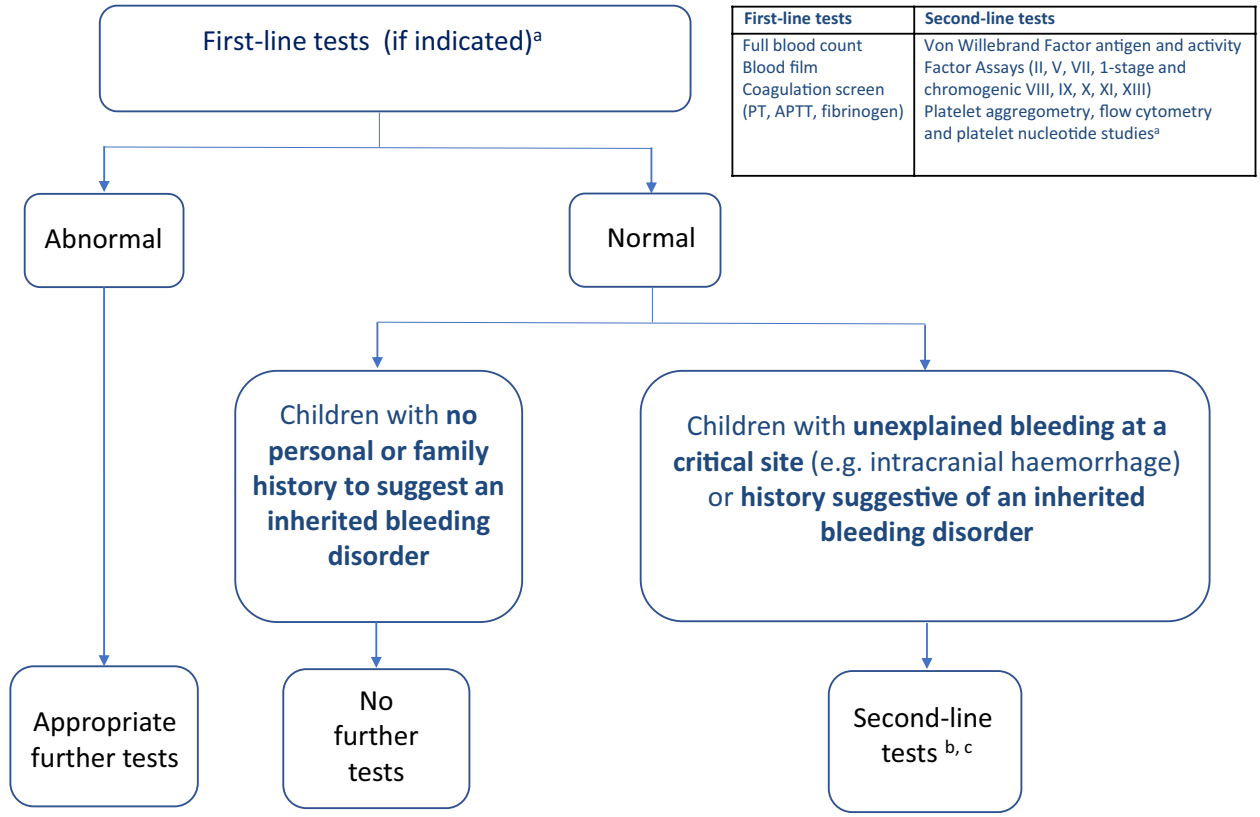
HAEMATOLOGICAL EVALUATION TO RULE OUT A BLEEDING DISORDER

Figure 1 shows a proposed pathway to guide the haematological investigations in cases of suspected physical maltreatment. When indicated, it is important that testing is timely to avoid delay in appropriate action if a bleeding disorder is or is not identified.

First-line haematological testing

When haematological evaluation is required, first-line tests should be requested. These tests are a full blood count, blood film, and a coagulation screen that includes prothrombin time (PT), activated partial thromboplastin time (APTT) and fibrinogen level. These tests are primarily to identify or exclude an acquired condition. It is important to note that many IBDs will not be ruled out by normal first-line investigations, although some inherited disorders will be identified following coagulation screening, e.g., isolated prolonged APTT in severe haemophilia.

It has been standard practice in many centres, including some district general hospitals (DGHs), to include von



First-line tests	Second-line tests
Full blood count Blood film Coagulation screen (PT, APTT, fibrinogen)	Von Willebrand Factor antigen and activity Factor Assays (II, V, VII, 1-stage and chromogenic VIII, IX, X, XI, XIII) Platelet aggregometry, flow cytometry and platelet nucleotide studies[a]

[a] Second-line tests may be performed at the same time as first-line tests in some circumstances (refer to text)
[b] Platelet function tests may need to be deferred until after 12 months of age. If so, consider flow cytometry for platelet glycoproteins to exclude a severe platelet function disorder (Glanzmann thrombasthenia, Bernard Souliersyndrome)
[c] If imminent risk of death and neither flow cytometry nor platelet aggregometry are possible, then using a Platelet Function Analyser can be considered (if available) and storing a sample of DNA

FIGURE 1 Pathway to guide haematological investigations in cases of suspected physical maltreatment where testing is indicated. APTT, activated partial thromboplastin time; PT, prothrombin time.

Willebrand disease (VWD) screen in first-line investigations. This is not advised. VWD screen results are frequently erroneous due to problems with sample preparation, sample transport, and analysis by laboratories with limited experience: this can result in repeated testing and may distort or delay medical opinion provided to the child protection investigation. In addition, if an IBD is suspected, second-line tests should be undertaken to investigate for all IBDs and not only VWD.

Second-line coagulation testing

If the presentation might indicate an IBD then the child should undergo second-line tests (at the same visit as first-line tests where practical). In the case of unexplained bleeding at a critical site, second-line tests should always be performed. If the first-line tests are normal and the clinician is confident that the child has no personal or family history to suggest an IBD, then no further tests are required. The decision-making process in relation to the need for second-line testing, which tests to perform, and where to do the testing should involve discussion between the paediatrician and haematologist according to the locally agreed referral pathway (refer to 'Developing a regional approach' below).

Second-line testing includes factor (II, V, VII, 1-stage and chromogenic VIII, IX, X, XI and XIII) assays, VWD testing and tests to assess platelet function (platelet aggregometry, flow cytometry and platelet nucleotide studies). Additional tests for rarer IBDs may be appropriate in selected cases with an extensive bleeding history.

Historically, platelet aggregometry has been the preferred option for the assessment of platelet function. A minimum volume of 12–20 ml whole blood is required to provide sufficient platelet-rich plasma by centrifugation for a full panel of agonists.[17] Where flow cytometry is available the typically more severe platelet function disorders, Bernard Soulier syndrome (BSS) and Glanzmann thrombasthenia (GT), can be detected by reduction in glycoprotein Ib and IIb/IIIa expression, respectively, using a much smaller volume of blood (5–6 ml). However, flow cytometry does not exclude other platelet function disorders. Screening using the Platelet Function Analyser (PFA) has significant limitations and is not recommended for routine use in this setting. It has low sensitivity for mild disorders[18] and there are other factors that can affect the result, e.g., some drugs, mode of sample collection and sample transport. Use of the PFA should be limited to situations where there is no access to standard laboratory tests of platelet function and the diagnosis of a severe

platelet function disorder would alter management and potentially outcome.

Undertaking genetic or genomic testing in addition to phenotypic haematological investigations does not increase the diagnostic yield in this patient group and is not indicated. Abnormalities that are not sufficient to result in phenotypic laboratory abnormalities are unlikely to account for the clinical presentation. However, it may be appropriate to consider storing a blood sample for directed genetic testing from a moribund child when other testing is unavailable.

For some cases there may be a benefit to a stepwise considered approach to second-line testing, based upon presentation, index of clinical suspicion of IBD, age and practical considerations,[19] e.g., it may be reasonable to perform factor assays and VWD testing first, only performing tests to assess platelet function later if those assays are normal. However, this approach should be weighed up against the importance of limiting the number of times a child undergoes venepuncture and the needs of families who have to travel a long distance to have blood sampling in a tertiary centre.

Adapting haematological testing to specific circumstances

Platelet aggregometry is not recommended in children under the age of 12 months and may be difficult in children under the age of 3 years, due to the large volume of blood required for testing.[17] In these cases, flow cytometry can be used for assessment of platelet glycoproteins, to identify/exclude the more severe platelet function disorders, BSS and GT. If flow cytometry is not available then a limited aggregometry panel (on a smaller volume of 5–9 ml whole blood) may be appropriate, e.g., a single concentration of the agonists' adenine diphosphate, arachidonic acid, collagen and epinephrine, and high and low concentrations of ristocetin.[17]

Recommendations

- **Suggested first-line investigations are a full blood count, blood film and basic coagulation screen (PT/APTT/fibrinogen).**
- **First- and second-line testing is advised if there is bruising and an IBD is suspected from the history, and/or there is unexplained bleeding at a critical site, and would include assays of factors II, V, VII, 1-stage and chromogenic VIII, IX, X, XI and XIII, von Willebrand disease testing and tests to assess platelet function.**
- **Platelet aggregometry to assess platelet function in children who are aged <12 months should be avoided.**
- **It is suggested that second-line testing involves discussion between the responsible paediatrician and a haematologist.**
- **Timely testing is desirable in order to avoid delay in appropriate action when a bleeding disorder is or is not identified.**

PRACTICALITIES OF BLOOD SAMPLING AND LABORATORY TESTING

Developing a regional approach

Many children requiring haematological investigations will be cared for initially, or solely, in a DGH setting. Therefore, close liaison between haematologists and paediatricians within the region to establish locally agreed testing and referral guidelines is crucial to ensure effective and consistent practice.

Initial first-line haematological testing and some second-line coagulation testing may be possible in the DGH, with help in interpretation of results from the local adult haematology team. 'Adult' haematologists may have limited experience of paediatric haematology, interpretation of results in relation to paediatric reference ranges and of child safeguarding procedures. Therefore, further options are to test locally and ask for help with the interpretation of results from the tertiary paediatric haematology team, or alternatively to transfer the care of the child to a tertiary paediatric centre for second-line testing. In this latter case, it is important that the lead consultant for the child protection investigations is clearly identified. If the lead is not to remain the referring consultant, there should be consultant to consultant discussion to identify an appropriate lead paediatric consultant to provide ongoing safeguarding advice and opinion in the tertiary centre. There may be some circumstances in which a child is too unwell to be transferred or is in a moribund condition. Whilst acknowledging that the results may be altered by transport and storage artefacts, in these cases, blood samples may need to be taken at the DGH and transported to the tertiary centre for analysis.

Issues related to blood sampling

Correct sampling technique is important to reduce pre-analytical variables.[20] A free-flowing venous blood sample should be collected into suitable paediatric citrated tubes and filled to the appropriate level (often indicated by a minimum fill line). Overfilled, underfilled and haemolysed samples may give erroneous results and should not be processed. The blood tube should be inverted five to six times gently. The sample should be transported to the laboratory at room temperature, ideally within 2 h, which may be most practical if taken early in the morning. Samples that are taken out of hours may be spun down (with accepted loss of the ability to test platelet function), and plasma frozen at –20°C or below for later testing.

Samples should not be taken from indwelling lines that have been flushed with heparin as contamination frequently occurs despite initial removal of dead-space blood. Sampling for platelet function testing may need to be deferred in children who have been exposed to medications anticipated to alter platelet function.[21] Patients with a high haematocrit, such as children with underlying congenital heart disease, may require the volume of anticoagulant to be adjusted.[22] The presence of icterus, haemolysis and lipaemia may also interfere with analytical procedures.

Some children may require repeated testing, which can be difficult for both the child and parents/carers. It is good practice to avoid more than two to three attempts at blood sampling on a given day due to anticipated rise in acute phase coagulation proteins due to pain. The clinical indication for blood testing must be balanced against the distress caused to child and parent/carer and the responsible clinician may decide that further sampling should be deferred.

Processing, transportation, and storage of blood samples

Samples should be accompanied by an electronic or paper request that identifies the clinical context, e.g., 'child protection investigation', to ensure that they are processed in a timely manner. Spare plasma samples should be suitably stored in case further tests are needed. Alerting the laboratory and haematologist in advance of the samples arriving may help to expedite the testing and reporting.

Laboratory requirements

The limitations of the routine screening tests (PT/APTT) need to be understood as laboratory reagent/analyser combinations have different sensitivities to reduced factor levels found in heterozygous deficiencies. Centres performing first-line investigations should be accredited to the International Organization for Standardization (ISO) 15189 laboratory testing standards for all tests that are offered. Comprehensive second-line testing requires the use of a tertiary specialist haemostasis laboratory, which is ideally accredited for the whole repertoire. Ideally, results would be reported with locally-derived paediatric normal ranges. However, due to the difficulties in collecting normal samples across all age groups in statistically significant numbers, published paediatric ranges are usually used.[23,24] Further differences may arise dependent on the coagulation analyser and reagent combination, so reference ranges ideally need adapting not only for age but also for the local laboratory.[25]

Recommendations

- **The development of locally agreed, regional guidelines for laboratory testing in the context of child protection investigations is encouraged, along with referral pathways and contact details of the haematologist(s) who can assist with the interpretation of results.**

INTERPRETING THE RESULTS OF HAEMATOLOGICAL TESTING

Accurate interpretation of laboratory results is essential as a bleeding disorder diagnosis will be of clinical relevance for the child and because court proceedings require accurate medical information to make safe decisions.

There are challenges in the interpretation of coagulation test results in children, particularly those who are very young. Difficulties may arise as a result of developmental haemostasis, pre-analytical problems, poor reproducibility of some tests and the need to interpret the findings in the context of the clinical presentation.

This level of complexity may necessitate interpretation by a haematologist who may in turn require advice from a haematologist with specific expertise in paediatric haemostasis. The frequency of identifying any, clinically significant or insignificant, abnormal result in a laboratory test undertaken as part of an investigation of suspected physical maltreatment has been reported as 16%–20% and an acquired bleeding disorder or IBD in 0.5%–4%, although there is considerable variation between studies in terms of the indications for testing, the nature of the testing performed and the interpretation of abnormal laboratory tests in terms of their clinical relevance.[26,27]

Pre-analytical variables

The results of coagulation tests in smaller children, particularly infants, can be affected by pre-analytical variables. Difficult venepuncture may result in sample activation or inadequate sample volume. This is particularly relevant to the testing of platelet function using aggregometry due to the large volume of blood required. Although not specific to paediatrics, deterioration of coagulation factors due to prolonged transport of samples to a laboratory may provide falsely reduced levels. It is generally recommended that samples are analysed within 4 h of blood sampling.[28]

Developmental haemostasis

Several coagulation factor levels change with age and vary in the age by which they have the same normal range as adults. There is also a difference in coagulation factor levels between term and pre-term infants.[29] Coagulation factor assays must be interpreted with reference to age-related normal ranges. In practice, this most commonly relates to low levels of factors IX and XI in young infants.

Transient abnormalities of blood coagulation tests

Fibrinogen, factor VIII and von Willebrand factor (VWF) are acute phase proteins and elevated levels are seen in response to infection, inflammation, trauma, surgery, or venepuncture. This stress response may be sufficient to 'mask' mild haemophilia A or type 1 VWD if blood is sampled during the acute phase. Normal levels in this setting may

not exclude the diagnosis of a mild bleeding disorder.[30] In one study, a cut-off of 100 iu/dl for VWF antigen or activity has been reported to exclude VWD on a single test with a predictive value of 95% but at lower levels repeat testing may be required.[31]

Prolongation of the PT has been documented as a consequence of traumatic brain injury, attributable to parenchymal brain damage.[32,33] A retrospective study in victims of suspected non-accidental injury showed high incidence of prolonged PT and APTT of 22.5% and 17.4% respectively, at presentation.[26]

In VKDB, the PT is prolonged and levels of the vitamin K-dependent factors (II, VII, IX and X) are reduced, sometimes accompanied by a prolonged APTT. Correction by administration of oral or parenteral vitamin K, with or without plasma, results in normalisation of the coagulopathy.[34,35]

Lupus anticoagulant is a frequent consequence of viral infection during childhood. It can result in an isolated prolonged APTT, which corrects to normal using a lupus-insensitive APTT reagent but does not correct on a 50:50 mix with normal plasma. It does not result in a bleeding tendency unless it is associated with acquired prothrombin deficiency. Laboratory evidence of a lupus anticoagulant persists beyond 3 months in 50% of cases.[36]

Indications for repeat testing

Repeat testing should be avoided where possible although is advised in the following circumstances:

- An abnormality has been identified which is likely to represent a clinically significant IBD.
- Levels of acute phase coagulation proteins, e.g. factor VIII, VWF and fibrinogen, are lower than would have been anticipated in the context of stress, trauma or surgery.
- There is a reduction in the level of coagulation factor(s) in a young child, even when the level is consistent with the age of the child and is suspected to be physiological, e.g., factor IX, factor XI.
- Results are in keeping with a probable transient acquired abnormality, e.g., vitamin K deficiency.

The timing of repeat testing should be according to clinical need, e.g., in the absence of haemorrhagic symptoms or the need for an invasive procedure, repeat testing of suspected physiological reduction in coagulation factor(s) should be delayed until mature levels are anticipated, usually at 6–12 months of age.[29] This may require the physician to provide the court with specialist explanation of the available results in the interim. For a suspected transient acquired abnormality the timeframe for repeat testing will depend on the usual timeframe for resolution of the abnormality. In the case of an abnormality that is likely to be clinically significant, referral to a paediatric haematologist is recommended for confirmatory testing and management plan.

Reporting of haematological tests

It is appropriate for normal results to be reported by a paediatrician or haematologist with limited experience in paediatric haemostasis. However, reporting of abnormalities that are identified on haemostatic testing should be performed by a haematologist with sufficient expertise in laboratory haemostasis. Care should be taken in the interpretation of an abnormality that would be anticipated to cause only minor haemorrhagic symptoms as the diagnosis of a mild bleeding disorder may not be sufficient to explain the presenting features.[15] It may not be the role of the reporting haematologist to decide whether the clinical presentation was explained by the bleeding disorder diagnosis but it is important to describe clearly the expected clinical implications of the disorder of haemostasis that has been identified. Equally, the interpretation of minor abnormalities that are likely to be due to artefact, such as minor reductions in platelet aggregation responses in small children, requires expertise in the limitations of laboratory methods.

Appendix S2 contains some example cases that illustrate many of the issues highlighted in this Good Practice Paper.

Recommendations

- **Results of coagulation factor assays should be interpreted with respect to locally-derived or published age-related reference ranges.**
- **It is advised that repeat testing is limited to situations in which it is of clinical relevance to the child, unless otherwise directed by a court.**
- **Abnormal coagulation test results should be interpreted and reported by an individual who has the relevant experience in laboratory haemostasis.**
- **The laboratory report should make clear that a mild bleeding disorder diagnosis may not account for the clinical presentation of the child and correlation with the history and physical findings is essential.**

RESPONSIBILITIES OF THE CLINICIAN

Healthcare professionals have a duty to co-operate fully in child protection procedures.[37] Treating clinicians investigating possible child physical maltreatment may be called as a professional witness to give written and oral evidence in family law proceedings and in criminal proceedings. This is usually the consultant paediatrician, but a haematologist may be asked to report on the results of laboratory testing. This responsibility is distinct from being instructed as an expert, which lies outside the scope of this document, although it is expected that an expert paediatrician or haematologist would follow the same good practice guidance. Comprehensive guidance on the legal duty of clinicians is

provided by the General Medical Council (GMC)[37,38] and by the RCPCH.[39] Clinicians can access support from their Trust Named Doctor for safeguarding children.[40]

Treating clinicians are witnesses of fact and are expected to provide professional interpretation of the facts (e.g., investigation results) and an explanation of their diagnosis and treatment.[39] In family law proceedings, this usually involves providing a written report, followed by response to written questions from legal representatives on points of clarification about the facts of the case. Confidential information can be shared without consent if it is required by law or directed by a court.[38] Reports should use language and terminology that people who are not medically qualified will understand. Abbreviations and medical or other technical terminology should be explained.[37] If the doctor is concerned that they are being drawn into a debate outside of their role they should not hesitate to raise this in their response.[39]

Investigations which are clinically indicated should be undertaken within the NHS and, where possible, in a timescale that supports the court timetable for the child.[41] If the court directs that an investigation, which is not warranted solely on clinical grounds, needs to be undertaken to assist in its decisions, this will be directed and funded by the court. The assistance of the NHS clinician may be sought to facilitate the investigation.

Recommendations

- **A clinician providing clinical opinion to a court should familiarise him/herself with the available GMC and RCPCH guidance.**
- **Employing organisations and their nominated named professionals for safeguarding children are expected to provide support for healthcare professionals required to provide evidence to family or criminal law proceedings.**
- **A clinician who acts as an independent expert for the legal representatives should ensure that any testing they recommend as part of their independent expert opinion, is in the best interests of the child.**

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CONFLICT OF INTEREST

The BSH paid the expenses incurred during the writing of this good practice paper. All authors have made a declaration of interests to the BSH and Task Force Chairs that may be viewed on request. The following authors have undertaken advisory board, educational grant and speaker's fees: Peter Baker for Sobi; Tina Biss for Bayer, Boehringer Ingelheim and Leo Pharma; Elizabeth Chalmers for Bristol Myers Squib, CSL Behring, Roche, Sobi and Takeda; John Grainger for Alexion, Amgen, Dova and Novartis. Sarah Dixon, Caroline Grayson, Christine Macartney and Keith Sibson have no conflicts of interest to declare.

REVIEW PROCESS

Members of the writing group will inform the writing group Chair if any new pertinent evidence becomes available that would alter the strength of the recommendations made in this document or render it obsolete. The document will be archived and removed from the BSH current guidelines website if it becomes obsolete. If new recommendations are made an addendum will be published on the BSH guidelines website (https://b-s-h.org.uk/guidelines/).

DISCLAIMER

While the advice and information in this guidance is believed to be true and accurate at the time of going to press, neither the authors, the BSH nor the publishers accept any legal responsibility for the content of this guidance.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article: Appendix S1. Literature review details; Appendix S2. Example case studies.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analysed.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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