B.S.O.A
British Society of Orthopaedic Anaesthetists

WINTER NEWSLETTER

February 2023

Dear BSOA Members,

As we embark on a new year, 2023 and thank you on behalf of the BSOA committee and the wonderful team in Event Management Direct, I wish you the best for the coming year and thank you for your support over the past years.

Collectively, we delivered a meeting that was scored in excellent category by most attendees. As a charity you may be aware that all the work done by individuals is voluntary to support our society. We are pleased to announce the election of 3 new members to the committee, who deeply dedicated to the progress of education and training in anaesthesia with an interest in trauma and orthopaedics. A specialty which accounts for close to one fifth of all surgery done in the NHS.

The new elected committee members are
Dr Timothy Moll, Consultant Anaesthetist, Sheffield Teaching Hospital.
Dr Anil Rao, Consultant Anaesthetist, Royal Orthopaedic Hospital Birmingham.
Prof Anil Hormis, Consultant Anaesthetist, Rotherham.

We look forward to our next annual scientific meeting in London (date to be confirmed).

Hope you enjoy the article of interest written by Dr Vanisha Patel, Specialist Registrar in Anaesthetics.

We have included some of the best posters from the December 2022 meeting.

Very best wishes

DR EDA SILVA

Dr EJ da Silva
President of the BSOA

Perioperative blood conservation techniques

Dr Vanisha Patel, Specialist Registrar

Perioperative blood conservation techniques

Perioperative anaemia is a common finding in surgical patients. It occurs in 20% to 40% of cases and is a specific indicator for increased postoperative morbidity and mortality. [1, 2] Anaemia is defined by the World Health Organisation (WHO) as haemoglobin (Hb) concentration of less than 130 g/L for men and a 120 g/L for women. [3]. Table 1 outlines the 'Pillars of Blood Management'; a multimodal, evidence-based strategy consisting of three pillars: treating anaemia, reducing perioperative blood loss, and improving tolerance to anaemia. [4]

Table 1: Pillars of Blood Management (Adapted from Clevenger et al, 2015)

	Pillar 1	Pillar 2	Pillar 3
	Optimise erythropoiesis	Minimise blood loss	Manage anaemia
Preoperative	Diagnose anaemia Identify, evaluate and treat anaemia Treat absolute or functional iron deficiency Consider preoperative autologous blood donation Consider erythropoiesis-stimulating agents if nutritional anaemia is ruled out/treated Refer for further evaluation as necessary	Identify and manage bleeding risk (past medical and family history) Review medications (antiplatelet, anticoagulation therapy) Minimise iatrogenic blood loss Procedure planning and rehearsal	Compare estimated blood loss with patient-specific tolerable blood loss Assess and optimise patient's physiological reserve, e.g., pulmonary and cardiac function Formulate patient-specific management plan using appropriate blood-conservation modalities
Intraoperative	Schedule surgery with optimisation of red cell mass	Meticulous haemostasis and surgical techniques Anaesthetic blood-sparing strategies Acute normovolaemic haemodilution Cell salvage/reinfusion Pharmacological haemostatic agents	Optimise cardiac output Optimise oxygenation and ventilation Evidence-based transfusion thresholds
Postoperative	Stimulate erythropoiesis Manage nutrition and correctable anaemia (e.g., avoid folate deficiency, iron-restricted erythropoiesis) Beware of drug interactions that can increase anaemia	Monitor and manage bleeding Avoid secondary haemorrhage Maintain normothermia (unless indicated specifically) Autologous blood salvage Minimise iatrogenic blood sampling loss Haemostasis/anticoagulation management Be aware of adverse effects of medicines Prophylaxis of upper gastrointestical haemorrhage	Maximise oxygen delivery Minimise oxygen consumption Avoid/treat infections promptly Evidence-based transfusion thresholds

Preoperative strategies

A patient-specific risk assessment for transfusion should be carried out for all patients but it is especially important for those in whom there is potential for high blood loss during surgery. Preoperative optimisation includes the identification and treatment of preoperative anaemia with consideration of patient comorbidities such as ischaemic heart disease and the appropriate management of perioperative anticoagulation.

Identifying and treating anaemia

Identifying the underlying cause of anaemia is key to effective treatment and optimisation. Causes include impaired red cell production, increased breakdown, or blood loss. The cause can be identified by a combination of thorough history taking, examination, and simple blood investigations such as Hb level, RBC morphology, and haematinics. The primary causes of a microcytic anaemia are iron deficiency and congenital haemoglobinopathies.

Oral iron therapy is a low-cost treatment for iron deficiency. However, patient compliance may be an issue as a result of the unwanted gastrointestinal side effects such as constipation. Preoperative oral iron therapy has been shown to reduce blood transfusion requirements, however, therapy with good compliance for a period of one month or more may be required to adequately improve body iron stores.

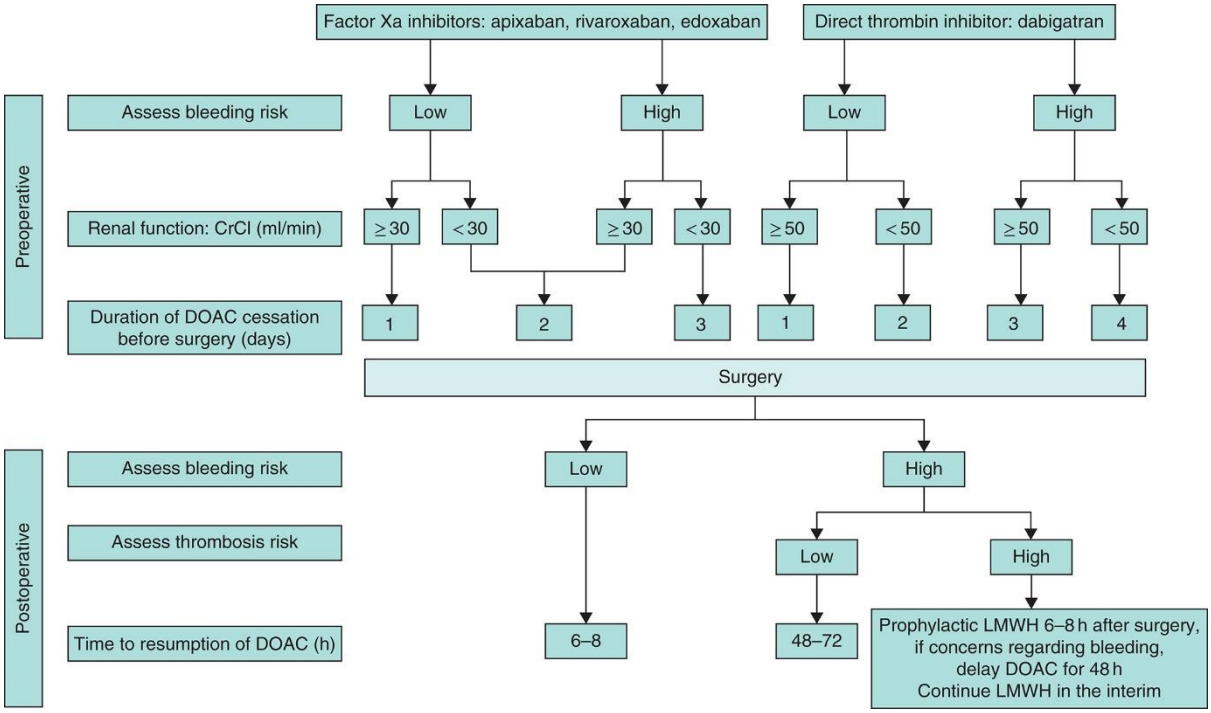
Intravenous iron preparations have been shown to be effective in the treatment of iron deficiency anaemia with fewer side effects than oral preparations.[5] Newer preparations such as ferric carboxymaltose have improved safety profiles compared to older preparations, e.g., iron dextrans. Intravenous iron therapy has been shown to decrease allogenic blood transfusion, increase haemoglobin concentration with no significant increase in mortality and morbidity associated with infusion. [6]

Exogenous, synthetic recombinant EPO can be used to stimulate RBC proliferation and it has been used successfully in patients with chronic kidney disease on dialysis. The recent NICE guidance however, concluded that the benefit from a reduction in the numbers of patients transfused was offset by a potential increase in mortality and thrombotic complications. NICE recommended that EPO should not be used in surgical patients to reduce blood transfusion. Therefore, a haematologist must be involved in any decision to use EPO for severe preoperative anaemia. [7]

Anti-platelet/ anti-coagulant Drugs

Patients taking anti-platelet agents (such as aspirin and clopidogrel) and anticoagulants (such as warfarin and direct oral anti-coagulants (DOACS)) are at increased risk of peri-operative bleeding. The risk of intra-operative bleeding needs to be weighed up against the risk of a peri-operative thromboembolic event. This may require a multi-disciplinary discussion between the surgeon, anaesthetist, haematologist and patient. In high-risk patients bridging therapy, covering the immediate peri-operative period with short-acting heparin may be required.

Figure 1: Suggested algorithm for perioperative management of directly acting anticoagulants CrCl, creatinine clearance; DOAC, directly acting anticoagulant; LMWH, low molecular weight heparin. (Reproduced from A Shah et al, 2020) [8]



Intra-operative strategies

Blood Pressure Management

Lowering the mean arterial pressure (MAP) in a controlled way reduces end-organ blood flow and may help decrease blood loss. A number of methods can be used to lower blood pressure, these include deepening anaesthesia using volatile or total intravenous anaesthetic or using additional opioid such as remifenranil. Additionally, short-acting antihypertensives can be considered such as labetalol or a primary veno-dilator such as glyceryl tri-nitrate infusion.

However, the risk of deepening anaesthesia has been shown in hip fracture patients to increase the risk of postoperative delirium.[9] Therefore, the risks of inducing hypotension must be tailored for an individual patient and balanced to ensure appropriate vital organ perfusion.

Patient positioning

Correct patient positioning is a simple and effective intervention to reduce intraoperative blood loss. This is particularly important in patients undergoing surgery in the prone position (for example lumbar surgery). Incorrect positioning can lead to compression of the inferior vena cava with subsequent obstruction of venous return. The increase in hydrostatic pressure diverts blood towards the epidural venous plexus causing vessel engorgement and bleeding at the surgical site. [10]

Thermoregulation

Hypothermia, which is defined as a core temperature of less than 36.8C, can lead to altered enzyme function in the clotting cascade, including effects on fibrinolysis and reduced platelet function.[11] The combination of these factors may result in abnormal haemostasis with an increased risk of intraoperative bleeding. Hypothermia also leads to an increase in Hb oxygen affinity,

reduced cardiac output, and ultimately a reduction in tissue oxygenation.

NICE has issued guidance on the prevention and management of hypothermia in patients undergoing surgery. Examples of strategies used to avoid intraoperative cooling include regular temperature monitoring every 30 min, ensuring that the ambient theatre temperature is at least 21°C, using active forced air warming devices and administering intravenous fluids through a fluid warmer.[12]

Cell salvage

Where major blood loss might be expected, collection, processing, and reinfusion of autologous blood is becoming more widely used and accessible. NICE recommends the use of cell salvage for procedures when a very high volume of blood loss is anticipated, which the recent Association of Anaesthetists guidance considers to be greater than 500 ml. [13, 14]

Surgical techniques

The use of tourniquets for upper or lower limb surgery is widely used, however, overall blood loss may not be reduced due to the release of inflammatory mediators as a result of limb ischaemia resulting in increased overall blood loss. (15) Other methods can include staging of a surgical procedure where high loss of blood volume is likely.

Regional anaesthesia

Central neuraxial blockade (subarachnoid / epidural anaesthesia) results in blockade of preganglionic sympathetic nerve fibres, arterial hypotension and reduced peripheral venous pressures. These result in less arterial and, perhaps more noticeably, less venous oozing from the surgical site.

Haemostatic strategies

Anti-fibrinolytics

Three anti-fibrinolytic agents have been used to minimise bleeding and reduce the need for transfusion. Tranexamic acid (TXA) and ε-aminocarpic acid are lysine analogues that reversibly inhibit fibrinolysis by binding the lysine-binding sites on plasminogen, limiting the activation of plasmin, which cleaves fibrin strands. Aprotinin, is a naturally occurring serine protease inhibitor, which inactivates free plasmin but with little effect on bound plasmin. It has been associated with increased postoperative mortality rates. [16]

Prophylactic use of TXA has been shown to reduce perioperative blood loss in major orthopaedic surgery.[17] TXA should be offered to all adults undergoing surgery who are expected to have at least moderate blood loss (greater than 500ml).[18] The CRASH-2 (Clinical Randomization of an Antifibrinolytic in Significant Haemorrhage) trial showed that early (within 3 hours of traumatic injury) administration of TXA (1 g followed by a 1g infusion over 8 hours) significantly reduced the risk of death from haemorrhage and all-cause mortality in traumatic bleeding.[19]

Fibrin sealants

Fibrin sealants are composed of the clotting agent's fibrinogen (with or without factor XIII) and thrombin (plus calcium), which promote haemostasis when applied to wound surfaces, in a manner similar to the final common pathway of the coagulation cascade. These can be sprayed or applied in liquid form. Tranexamic acid can also be used in topical form, in a saline solution or as a gel. Studies have shown a reduction in autologous blood transfusion and a reduction in bleeding. [20, 21]

Viscoelastic haemostatic assays

Viscoelastic haemostatic assays are increasingly being used in the management of severe bleeding. The two commonest assays are thromboelastography (TEG) and rotational thromboelastometry (ROTEM). The main advantage of these assays is the quick turnaround time, with an assessment of all stages of clot formation available in a few minutes. Defects in particular parameters of clot formation allow more targeted haemostatic therapy. For example, prolonged clot initiation (R time) on TEG is suggestive of global depletion of coagulation factors and/or warfarin therapy.

Guidance from the British Society of Haematology also suggests that TEG/ROTEM may have a role in the management of trauma haemorrhage.[22]

Conclusion

The potential for intraoperative major blood loss is a key concern for surgeons and anaesthetists. Strategies to mitigate this, should be implemented throughout the patient's perioperative journey. Blood conservation techniques require a multi-modal, multi-disciplinary approach.

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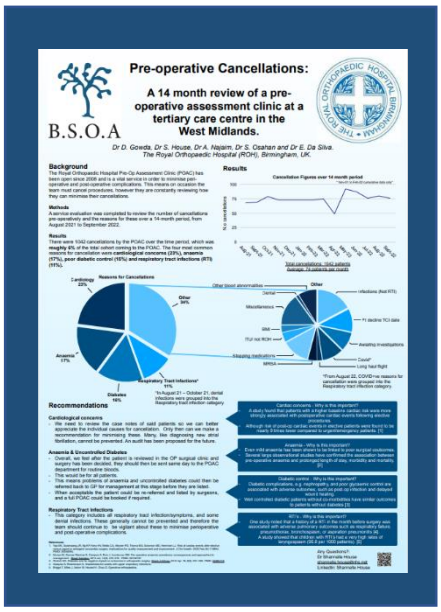
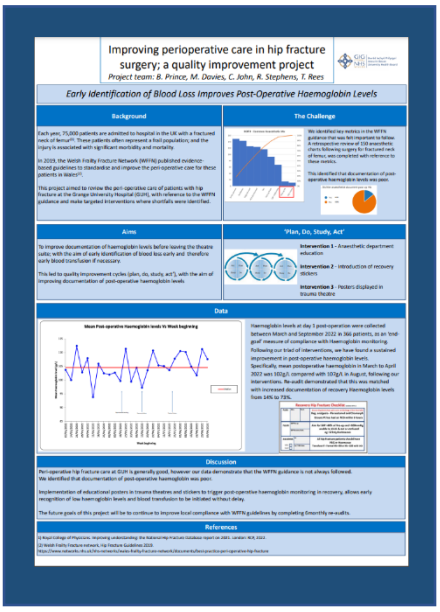
BSOA ASM 2022

Poster Presentations

The British Society of Orthopaedic Anaesthetists would like to thank all the individuals that submitted an abstract to the BSOA ASM 2022. Look at the some of the fantastic posters on display at our 2022 meeting below.





Challenges and opportunities of a regional anaesthesia training programme in a busy orthopaedic hospital: phase 2 survey results of trainees' experiences since COVID-19 outbreak

Oxford University Hospitals NHS Foundation Trust

Adductor canal block for anterior cruciate ligament reconstruction

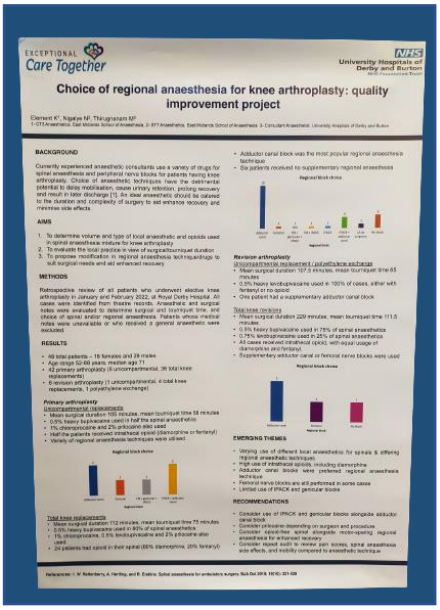
J. Barrowman, N. Sharma

Tameside General Hospital, Ashton-Under-Lyne, UK | Wrightington Hospital, Wigan, UK

Improving preoperative prescribing and fasting practices in non-elective surgical patients - A 'DAAFT' Quality Improvement Project

C. Torrilla, H. Atkinson, H. Hinsman

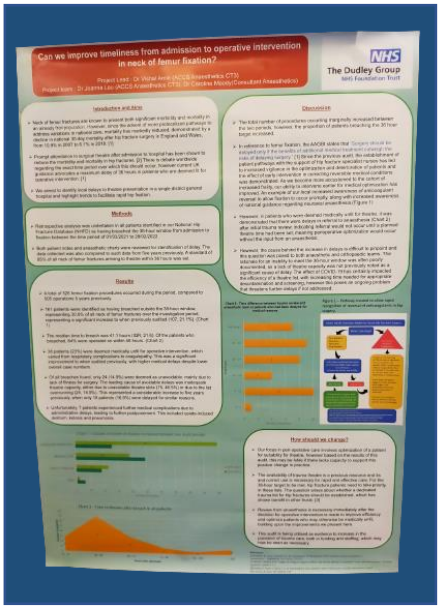
University Hospitals Sussex, St Richard's Hospital



Choice of regional anaesthesia for knee arthroplasty: quality improvement project

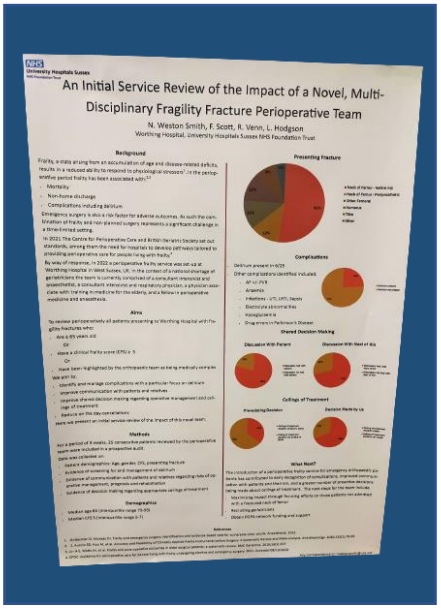
Exceptional Care Together

University Hospitals of Derby and Burton NHS Foundation Trust



Can we improve timeliness from admission to operative intervention in neck of femur fixation?

The Dudley Group NHS Foundation Trust



An Initial Service Review of the Impact of a Novel, Multi-Disciplinary Fragility Fracture Perioperative Team

University Hospitals Sussex NHS Foundation Trust

N. Weston Smith, F. Scott, R. Venn, L. Hodgson

Worthing Hospital, University Hospitals Sussex NHS Foundation Trust

Future Events

The British Society of Orthopaedic Anaesthetists are pleased to announce that their next Annual Scientific Meeting will be in London.

More information coming soon, check the websites for updates.

MEMBER BENEFITS

- ✓ Reduced registration fees for BSOA meetings
- ✓ Access to free webinars
- ✓ BSOA e-newsletters and the opportunity to publish articles in future issues
- ✓ Participation and voting rights at upcoming Executive Committee elections as well as eligibility to nominate and be nominated to the Executive Committee
- ✓ Participation and voting rights at the Annual General Meeting
- ✓ Access to the members-only area on our website including documents Library to search documents and Member Forum to join discussions and/or search topics

Questions? Comments? Suggestions? Email us anytime: info@bsoa.org.uk

Dr EJ da Silva
Editor and President, BSOA Executive Committee