Consultative haematology.
Part: preoperative management
Part II: common inpatient consultations

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Role of haematology consultant

- Dx & Mx of benign/malignant haematological disorders

- Involve: adult, child, adolescent, pregnant woman

Principles of effective consultations

Determine the question that is being asked

Urgency/Elective consultations (within 24 hrs)

Gather primary data

Communicate as briefly as appropriate

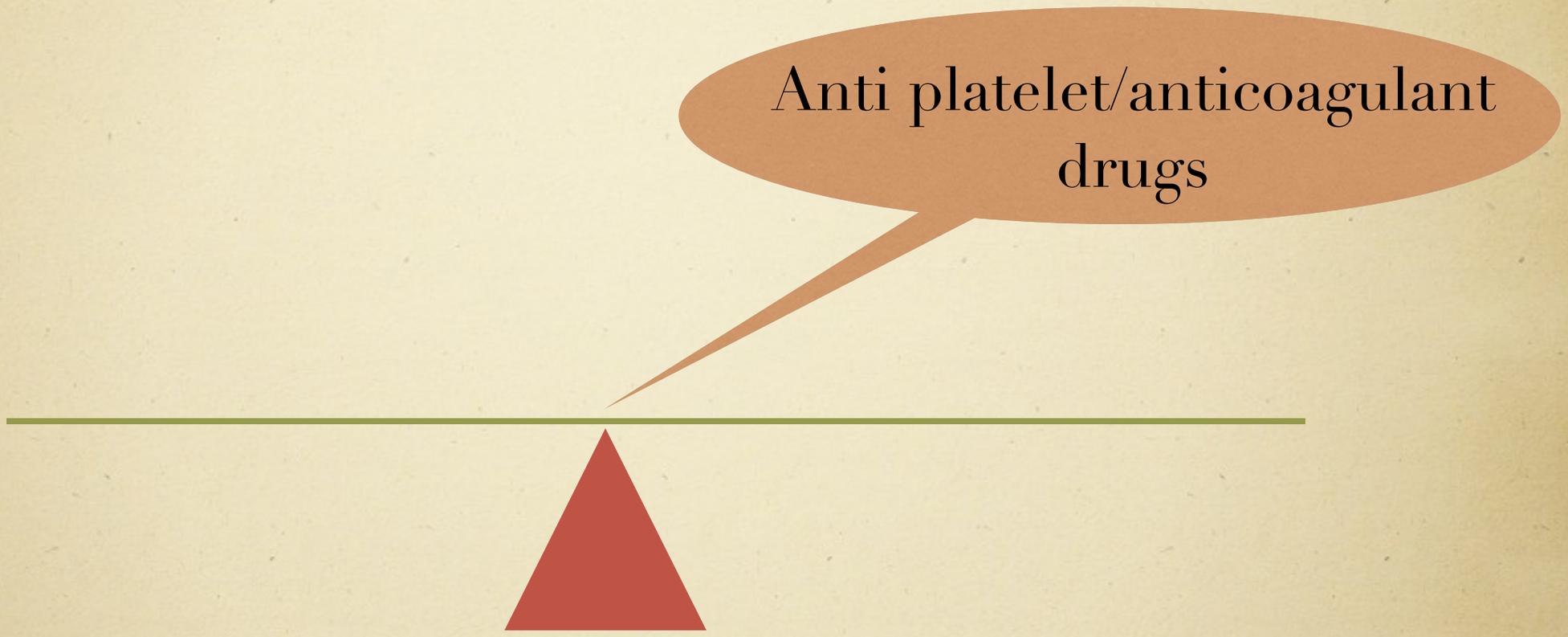
Make specific recommendations

Adapted from Goldman L, Lee T, Rudd P. Ten commandments for effective consultations. Arch Intern Med, 1983;143:1753-1755; and Sears CL, Charlson ME. The effectiveness of a consultation. Compliance with initial recommendations. Am J Med. 1983;74:870-876.

Clinical case 1

- 62-year-old man with recently diagnosed pancreatic cancer is scheduled to undergo a Whipple procedure.
- Diagnosed of DVT 4 weeks ago, on LMWH twice daily dose
- Consult for preoperative anticoagulant.

1.Perioperative management of antithrombotic therapy



Preoperative risk of thromboembolism in surgery

- High: thrombotic risk >10% (score 5-6 of CHADS2 score for mechanical mitral valves, AF, recent stroke or VTE)
- Moderate: 5-10%
- Low: <5% (score 0-2 of CHADS2, remote Hx of VTE > 12 months, no other thrombotic risk factors)

Risk factors for VTE in surgical patients

- type, extent of surgery, trauma, general anaesthesia >30 min
- duration of hospitalisation
- advanced age
- cancer
- personal or family history of VTE
- obesity
- immobility
- infection
- central venous catheter
- pregnancy/post partum stage
- thrombophilia

ACCP guideline for nonorthopedic surgery

- Very low risk: risk VTE (without prophylaxis) <0.5%
  - age<40 yr
  - no adverse patient or surgery related risk factor
    - major general thoracic or vascular: Roger score< 7
    - GI/uro/vascular/breast/thyroid: Caprini score 0
    - plastic&reconstructive: Caprini score 0-2
    - most outpatient or same-day surgery (very low)
    - spinal surgery for nonmalignant disease (low)
- general anaesthesia < 30 min

ACCP guideline for nonorthopedic surgery

- Low risk: risk VTE (without prophylaxis) ~1.5%
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  - no adverse patient or surgery related risk factor
    - major general thoracic or vascular: Roger score 7-10
    - GI/uro/vascular/breast/thyroid: Caprini score 1-2
    - plastic&reconstructive: Caprini score 3-4
    - spinal surgery for nonmalignant disease
- general anaesthesia < 30 min

ACCP guideline for nonorthopedic surgery

- Moderate risk: risk VTE (without prophylaxis) ~3%
  - age 40-60 yr
  - no adverse patient or surgery related risk factor
    - major general thoracic or vascular: Roger score >10
    - GI/uro/vascular/breast/thyroid: Caprini score 3-4
    - plastic&reconstructive: Caprini score 5-6
    - gynecologic non cancer surgery
    - cardiac surgery, most thoracic surgery
    - spinal surgery for malignant disease
- general anaesthesia >30 min

ACCP guideline for nonorthopedic surgery

- High risk: risk VTE (without prophylaxis) ~6%
  - age > 60 yrs undergoing major surgery
  - age 40-60 yrs with additional risk factor with major surgery
  - major general thoracic or vascular: Roger score NA
  - GI/uro/vascular/breast/thyroid: Caprini score >=5
  - plastic&reconstructive: Caprini score 7-8
  - bariatric surgery, gynecologic cancer surgery, pneumonectomy
  - craniotomy, traumatic brain injury, spinal cord injury
  - other major trauma

Nonorthopedic surgery

- very low risk: early ambulation alone
- low risk: mechanical prophylaxis (IPC)
- moderate risk: medication or mechanical prophylaxis (IPC)
- high risk: medication + mechanical prophylaxis (IPC)
- ******just depend on risk of bleeding*****

Patients on anticoagulants or antiplatelet drugs

- Warfarin
- Newer oral anticoagulants
- Heparins
- Antiplatelet drugs
- Systemic fibrinolytic agents

Preoperative management of warfarin anticoagulant (adapted from BSCH guidelines-4th edition 2011)

- Moderate/high risk of surgical haemorrhage
- Low risk of thrombosis (e.g.lone AF)
  - stop warfarin 5 days preoperatively
  - check INR on day before surgery
    - if INR < 1.5, proceed
    - INR 1.5 or above, give Vit K 1-3 mg IV
  - restart maintenance dose of warfarin on evening of surgery if haemostats secured

Preoperative management of warfarin anticoagulant (adapted from BSCH guidelines-4th edition 2011)

- Moderate/high risk of surgery haemorrhage
- High risk of thrombosis (e.g. mechanical heart valve-especially, mitral, VTE within 3 mo)

- stop warfarin 5 days preoperatively
- give “bridging therapy” with LMWH
- last dose of LMWH 24 hrs preoperatively
- restart maintenance dose of warfarin when oral intake possible and continue LMWH until INR in therapeutic range

Preoperative management of warfarin anticoagulant (adapted from BSCH guidelines-4th edition 2011)

- Semi-urgent surgery (within 6-12 hrs)
  - stop warfarin
  - give vit K 1-3 mg IV
  - significant correction of INR within 6-8 hr

Preoperative management of warfarin anticoagulant (adapted from BSCH guidelines-4th edition 2011)

- Emergency surgery or life threatening bleeding
  - stop warfarin
  - give 25-50 IU/kg of 4 factors prothrombin complexes (4PCCS)
  - give Vit K 5 mg IV
  - FFP produces suboptimal anticoagulant reversal, used if PCC is not available (10-20 ml/kg)

No stop warfarin

- minor dermatologic procedures (with adjunctive local homeostatic measures as necessary)
- cataract surgery

Approach to preoperative Mx of patients on warfarin undergoing major surgery

Stop warfarin 5 days before surgery

Assess preoperative thromboembolic risk

Low risk

No bridging
-resume warfarin 12-24 hrs after surgery and when homeostasis has been achieved

Moderate risk

Consider bridging
-based on assessment of individual patient- and surgery-related factors

High risk

Bridging anticoagulant
-use therapeutic dose SC LMWH or IV UFH
-administer last dose of LMWH 24 hrs before surgery
-resume therapeutic dose UFH or LMWH 48-72 hrs after surgery and when homeostasis has been achieved

UFHs

- short plasma half life, increase half life in renal dysfunction
- IV or SC
- therapeutic dose: aPTT ratio
- antidode: protamine sulphate (1 mg reverses 80-100 units of UFH, maximal dose 50 mg)

LMWHs

- longer half-life, 3-4 hrs, increase half life in renal dysfunction
- target anticoagulant effect (anti-Xa>anti-IIa)
- reduce risk of bleeding, lower risk of HIT & osteopenia
- partially reversible by protamine
- SC once or twice daily
- enoxaparin 1 mg/kg SC q 12 hr or 1.5 mg SC OD, tinzaparin 175 IU/kg SC OD
- monitor antiXa if CrCl < 20, decrease dose 50 % if CrCl <30 (for enoxaparin), no dose adjust if CrCl<30 for tinzaparin

Preoperative management of patients on heparins

- UFHs: stop infusion 6 hrs before surgery for full reversal (longer if renal dysfunction)
- LMWH: prophylactic dose
  - stop 12 hrs before surgery
  - therapeutic dose: stop 24 hrs before surgery

Directed anti-Xa

- Fondaparinux
- small molecule, effect only anti-Xa
- no antidote
- stop 24 hr before surgery

Antiplatelet drugs

- perioperative management of anti platelet>>>like warfarin
- relies an assessment of individual patient's thrombotic risk, procedure risk
- no stop aspirin in cataract surgery & minor dermatologic procedures
- major non cardiac surgery, low risk CV events>>>discontinue ASA 7-10 days before surgery
- moderate/high risk CV>>>continue ASA

Antiplatelet drugs

- CABG>>>>continue ASA
- dual antiplatelet>>>>hold clopidogrel or prasugrel 5 days before Sx
- coronary stent with receive dual anti platelet
  - defer surgery, 6 wks for bare metal stents, 6 months for drugs-eluting stems (highest risk for in stent thrombosis)
  - if surgery cannot delated>>>>continue dual anti platelet during and after surgery)

- NSAIDs: reversible platelet dysfunction, short duration of action
  - stop at least 2 days before surgery
- Abciximab (inhibit platelet surface receptors GPIIb/IIIa) use in ACS, inhibit platelet 12-24 hrs, half life 1.5 -2.5 hrs, invasive surgery delay 12-24 hrs, drug partially reversible by platelet transfusion

Systemic fibrinolytic agents

- streptokinase: reduce fibrinogen and anti-plasmin levels for several days

- rtPA (e.g, alteplase)reduce only fibrinogen, return to normal within 24 hrs

- treatment for haemorrhage or preparation for emergency surgery: antifibrinolytic agents (tranexamic acid, FFP, CPP or fibrinogen concentrate if plasma fibrinogen is < 1 g/L

Patient risks

- Thrombotic risk: high >>>risk of tumour progression, surgery cannot delayed
- Bleeding risk

2.Preoperative assessment of bleeding risk

- Related to both surgical & host factors
- Surgical factors = nature + extent of intervention, vascularity, fibrinolytic activity of surgical bed, compressibility of site, ability to achieve surgical homeostasis, procedure induce homeostatic defect (e.g, platelet dysfunction due to cardiopulmonary bypass)
- Host factors = underlying congenital/acquired homeostatic defect, use of drugs that effect homeostasis

Step 1: history taking

- Medical history >>> most important
- Personal history
- Abnormal bleeding>>> response to prior homeostatic challenges (surgeries, trauma, childbirth
- Comorbidities
- Use of medications

that effect hemostasis

Step 2: homeostatic laboratory evaluation

- Hx & PE suggest bleeding diathesis
- Platelet count, PT, aPTT
- Others: platelet function test, vWD, mild factor def, fibrinolytic disorder if clinical considered

- Preoperative hemostatic Mx

- Develop base on nature & severity of defect, bleeding risk of procedure

- Lack of high level evidence based

- Moderate to high procedure >>>keep plt 50 X 10^9/L

- Neurosurgery & ophthalmologic procedure (except simple cataract extraction) >>> keep put 100 X 10^9/L

Management of preoperative haemorrhage

- Inadequate local hemostasis/systemic hemostatic defect
- Homeostatic defects: unrecognised preexisting bleeding diathesis
  - Fx def, vWD
  - Platelet function disorder: drugs, uremia, dilution coagulopathy, DIC
  - *****increase risk of bleeding acid base disturbances, hypothermia*****

Low platelet count

- If platelet transfusion required >>>> single adult therapeutic dose (ATD) transfuse before procedure & post transfusion count checked (10 min after transfusion gives a reliable indication)

Platelet transfusion thresholds in surgery & invasive procedures

LP, central line insertion, liver&renal/ transbronchi al bx, EGD with Bx

Indication	Transfusion threshold/target
Most invasive surgery (including post-cardiopulmonary bypass	50 X 10^9 /L
Neurosurgery or posterior eye surgery	100 X 10^9 /L
Prevention of bleeding associated with invasive procedure	50 X 10^9 /L
Spinal anaesthesia	50 X 10^9 /L
Epidural anaesthesia	80 X 10^9 /L

BMA &BMBx can be performed in severe thrombocytopenia

Perioperative red blood cell : when need transfusion?

- Adults ICU: Hb ~7 g/dL
- Postoperative surgical: Hb ~8 g/dL or symptoms (chest pain, orthostatic hypotension, tachycardia unresponsive to fluid resuscitation, CHF) AABB 2012
- Decision to transfusion based on individual assessment of clinical status, oxygen delivery needs

Complication of red cells transfusion

- Infections: HIV, HCV >>> should preoperative autologous transfusion if necessary, NAT
- Bacterial overgrowth
- Volume overload
- Hemolysis from improper handling of stored units & clerical error

DDAVP
(desmoplasmin acetate)

- mild haemophilia A
- mild vWD
- qualitative platelet defect
- response to this agent should be documented before its use in acute setting

Antifibrinolytic drugs

- Tranexamic acid

- mucocutaneous bleeding: oral or IV conjugated oestrogen, give 5-7 days preoperatively

- reduce blood loss and blood transfusion after cardiac surgery, liver transplantation, prostatectomy (without increase risk of thrombosis in coronary revascularization or cardiopulmonary bypass)

FFP

- INR: expert opinion (no evidence in preoperative, only in active bleeding in setting of multiple coagulation factor def<massive transfusion, DIC), emergency reversal of warfarin(not available PCC), plasma exchange in TTP
  - mildly prolong INR (1.1-1.85) no elevate risk of bleeding
  - INR: not predict in liver disease (usually use global homeostasis; thromboelastography;TEG))
  - >1.5 neurosurgical patients
  - >2.0 patients who will undergo invasive procedure
  - undefined trauma patients who are receiving trauma-assonated transfusion algorithm
  - FFP 10-20 ml/kg/dose

CPP

- fibrinogen keep at least 100 mg/dL
- CPP 10 bag IV

Prothrombin complex concentration (PCC)

- plasma derived concentrates of vitamin K dependent clotting factors
- treatment of haemophilia B
- emergent reversal of warfarin-induced coagulopathy
- preoperative haemorrhage: report, need more investigate

Recombinant factor VIIa (rFvIIa)

- approved for treatment of congenital haemophilia A or B with inhibitors, acquired haemophilia (USA)
- congenital F VII deficiency, Glanzmann's thrombasthenia (Europe)
- preoperative hemorrhage>>>no benefit
- controlled trials>>no benefit in reduce transfusion in cirrhotic undergoing partial hepatectomy or otthotopic liver transplantation, increase risk of VTE (~9%)

Fibrin

- fibrin glue (inactivated human fibrinogen, thrombin, aprotinin)
- RCT: lacking evidence based
- use in cardiac surgery, urologic procedure, orthopaedic surgery, dental procedures, trauma, neurosurgery

What can we do ???

- Administration of last dose LMWH 24 hrs before surgery
- Intermittent pneumatic compression (IPC) >>immediate postoperative period
- Resumption of LMWH 48 hrs after surgery

Prevention and treatment of postoperative VTE

- Preprophylaxis era: incidence of fatal PE
  - elective surgery: 0.1%-0.8%
  - THR: 2%-3%
  - hip fracture Sx: 4%-7%

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