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MANAGEMENT OF THE SURGICAL PATIENT AFTER SURGERY: PONV AND VTE PROPHYLAXIS

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With acknowledgements to Nameer VanOosterom (PhD candidate, University of Queensland) & Rodney Neale (VTE CNC Princess Alexandra Hospital)

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DISCLOSURE

In relation to this presentation, I declare the following, real or perceived conflicts of interest:
Nil

A conflict of interest is any situation in which a speaker or immediate family members have interests, and those may cause a conflict with the current presentation. Conflicts of interest do not preclude the delivery of the talk, but should be explicitly declared. These may include financial interests (e.g. owning stocks of a related company, having received honoraria, consultancy fees), research interests (research support by grants or otherwise) or organisational interests.

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LEARNING OBJECTIVES

1. Identify risk factors for post-operative nausea and vomiting (PONV)
2. Describe the management of PONV
3. Identify risk factors for VTE in the post-operative period
4. Describe strategies to prevent VTE in the post-operative period

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PHARMACIST COMPETENCY STANDARDS

Pharmacist competency standards* addressed include:

- Standard 3.2.3 Dispense medicines (including compounded medicines) in consultation with the patient and/or prescriber
- Standard 3.3.2 Apply clinical review findings to improve health outcomes

National competency standards framework for pharmacists in Australia, 2016

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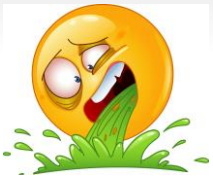
POST OPERATIVE NAUSEA & VOMITING



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DEFINITIONS

- **PONV**: Post Operative Nausea and Vomiting
  - Defined as nausea and/or vomiting occurring after surgery in the post anaesthetic care unit or in the first 24 hours postoperatively
- **PDNV**: Post Discharge Nausea and Vomiting
  - Used to define nausea and vomiting occurring after discharge for outpatient procedures
- **POV**: Post Operative Vomiting
  - Often used to describe post-op vomiting in children where it may be more difficult to assess nausea

For today's presentation, we will focus on PONV.

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PONV

- Common adverse effect of anaesthesia
  - Vomiting incidence: 30%[1]
  - Nausea incidence: 50%[1]
  - High risk patients, incidence can be up to 80%[1]
- Distressing to patients
  - Often rated worse than post-op pain by patients[2]
- Increased health care costs
  - Delayed discharge from PACU, hospital
  - Subsequent complications: wound dehiscence, oesophageal rupture, aspiration, dehydration, increased intracranial pressure, and pneumothorax[3]

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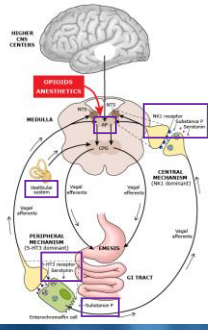
PONV MECHANISM

- Central Mechanisms
  - "vomiting center" in the medulla
  - Fear, pain, anxiety, anticipatory, stimulation of the vestibular system (e.g. surgical)
- Peripheral Mechanisms
  - Direct gastric stimulation (gastric trauma, blood, toxins)
- Drugs & Toxins
  - Opioids
  - Inhalational anaesthetics



NTS: nucleus tractus solitarius
AP: area postrema (chemoreceptor trigger zone)
CPG: central pattern generator

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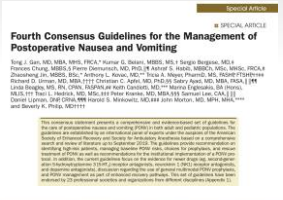
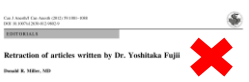
PONV EVIDENCE


Special Article

SPECIAL ARTICLE

Fourth Consensus Guidelines for the Management of Postoperative Nausea and Vomiting


EDITORIALS

Retraction of articles written by Dr. Yoshitaka Fujii

Donald R. Miller, MD

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PONV RISK ASSESSMENT

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PONV RISK ASSESSMENT

- Anaesthetic risk factors
- Patient risk factors
- Surgical risk factors

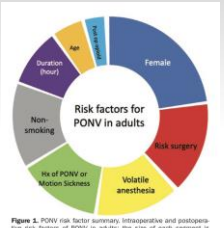

Figure 1. PONV risk factor summary. Intraoperative and postoperative risk factors of PONV in adults; the size of each segment is proportional to the odds ratios of PONV associated with each risk factors.[3] PONV indicates postoperative nausea and vomiting. Figure reused with permission from the American Society for Enhanced Recovery. For permission requests, contact info@aserhq.org.

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APFEL RISK ASSESSMENT

- APFEL: validated risk assessment tool
- Simple, easy to use

Risk Factors	Score
Female Gender	1
Non-smoker	1
History of PONV	1
Postoperative Opioids	1
Sum =	0...4

Score	% Risk	
0	10%	Low
1	20%	
2	40%	Medium
3	60%	High
4	80%	

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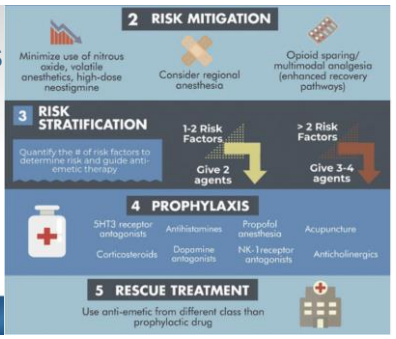
PONV PROPHYLAXIS

- 2020 guidelines now recommend multimodal prophylaxis if 1+ risk factor[1]



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MEDICATIONS

We will now discuss some of the common medications you will see for PONV management

Considerations:
- Evidence – Benefit
- Side effects
- Cost

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ONDANSETRON

Mechanism of Action	5HT3 Antagonist
Evidence	"Gold Standard". First line for prophylaxis[1,5]. NNT: 6 to prevent vomiting, 7 to prevent nausea[1]
Side Effects	Constipation, headaches, elevated liver enzymes, some evidence of QT prolongation. NNH (single dose): 36 (headache), 31 (raised LFTs), 23 (constipation)[1]
Administration	IV administration preferred (slow push over 2-5 minutes) Can also be given IM. Best given at the end of the case. **Dose = 4mg IV** (preferred) or 8mg PO dispersible

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DEXAMETHASONE

Mechanism of Action	Corticosteroid
Evidence	Similar efficacy to 4mg IV ondansetron or 1.25mg IV droperidol. Opioid sparing[1]
Side Effects	Trials underway to assess impact on BSLs and infection rates (PADDI[6])
Administration	IV administration, **dose = 4-5mg**, to be given after induction (start of surgery)

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PADDI TRIAL

PADDI Trial
Perioperative ADministration of Dexamethasone and Infection

P: Adults, ASA I to IV, undergoing elective or expedited nonurgent, noncardiac surgery with GA, an expected operation time of at least 2 hrs, 1 night hospital stay, incision >5cm. Surgery wasn't to be associated with a primary infection (e.g. infected prosthesis). Pts excluded if poorly controlled diabetes (HbA1C > 9.0%)

I: Dexamethasone 8mg vs placebo (**C**)

O: n = 8800

- Primary outcome: surgical site infections dexamethasone (8.1%) placebo (9.1%) p<0.001 CI (0.77 – 1.03) **noninferior**
- Noninferiority shown in subgroup analysis for patients with and without diabetes

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DROPERIDOL

Mechanism of Action	Dopamine antagonist
Evidence	Efficacy similar to ondansetron, NNT = 5 to prevent PONV. Superior to metoclopramide doses <20mg[1]
Side Effects	QT prolongation, arrhythmias and sudden death (black box warning FDA 2011, but doses used for PONV → unlikely) Other side effects include: drowsiness (dose related), dizziness, hypotension, tachycardia or extrapyramidal side effects (EPS) such as tardive dyskinesia, dystonia or akathisia.
Administration	IV administration preferred (slow push over 2-5 minutes) Can also be given IM. Dose: **0.625mg – 1.25mg**. Best given at the end of the case

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METOCLOPRAMIDE

Mechanism of Action	Dopamine Antagonist
Evidence	Weak antiemetic at doses < 20mg. NNT to prevent PONV at 24 hours = 30 (10mg), 16 (25mg) and 11 (50mg)[1]
Side Effects	Dyskinesias or EPS (rate of 0.3% for 10mg dose, 0.6% for 25mg and 50mg doses). NNH for EPS with 25 and 50mg doses is 140[1]
Administration	IV administration, dose still capped at **10mg** for PONV (?effectiveness). Slow IV push over 3 – 5 minutes. Can be given IM

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CYCLIZINE

Mechanism of Action	Histamine H_1 receptor antagonist (sedating antihistamine)
Evidence	Not recommended in ASA Consensus Guidelines or eTG. Indicated for prevention of PONV.
Side Effects	Sedation, psychomotor disturbances (can occur the day after a dose), anticholinergic side effects (dry eyes, dry mouth, urinary retention, constipation)
Administration	Give as a slow IV injection over 3-5 minutes. **Dose = 50mg q8h PRN**. Incompatible with NaCl. Recommended to flush the line with WFI or glucose 5% pre and post injection

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OTHER ANTIEMETICS

- Hyoscine Hydrobromide ("scopolamine")[1]
  - transdermal patch, recommended to place behind the ear the night before to 2 hours pre-surgery (onset = 2-4 hours)
  - NNT to prevent nausea and vomiting in 24 hours = 6
  - New data: equally effective as single agent compared to ondansetron & droperidol
  - Adverse effects: generally mild
    - Visual disturbances (NNH = 5.6), dry mouth (NNH = 13) or dizziness (NNH = 50)
- Propofol: can be used as a rescue antiemetic at subhypnotic doses (20mg PRN)[1]
  - Effect brief but has been found to be as effective as ondansetron
  - Propofol as part of TIVA (total IV anaesthesia) reduces baseline risk of PONV
    - NNT to reduce PONV in first 6 hours = 5

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PONV PROTOCOLS

- Many hospitals have a PONV protocol
- Communicate with patients that they can ask nursing staff for antiemetics
- Review other medications that may be causing nausea

Metro South Health | *PRINCESS ALEXANDRA HOSPITAL*
Clinical Practice Guideline

SECTION: Clinical **Guideline No.** 01321/v1/09/2018
CLINICAL PRACTICE GUIDELINE TITLE: Postoperative Nausea and Vomiting (PONV) – Prophylaxis and management

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CONCLUSIONS

- Patient centered outcome
- Cost effective
- Risk assessment
- Appropriate prophylaxis
- Consider PDNV and potential management options for high risk patients having outpatient procedures

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VTE PROPHYLAXIS

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Venous Thromboembolism

VTE

VTE: a blood clot that that starts in a vein

Pulmonary Embolism

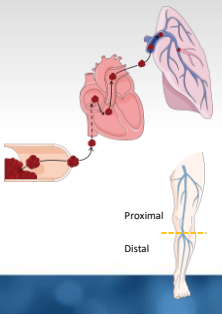
PE

Occurs when a DVT breaks free from a vein wall, travels to the lungs and blocks some or all of the blood supply. ***Proximal DVT*** *= higher risk of PE than distal*

Deep Vein Thrombosis

DVT

A clot that starts in a deep vein, usually the leg, but can also be the arm or other veins. ***Proximal DVT:*** *thrombus in the popliteal, femoral or iliac veins.* ***Distal DVT:*** *thrombus below the knee in the calf veins*



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HOSPITAL ACQUIRED VTE (HA-VTE)

- Contributes to morbidity and mortality
  - Symptoms may include: pain, swelling, tenderness, limited mobility, difficulties breathing/respiratory distress, tachycardia, arrhythmias[2]
  - Can lead to chronic disease[3]
  - VTE accounts for 10% of all hospital deaths[4]
- Appropriate VTE prophylaxis can prevent up to 70% of VTE cases[4]
- Estimated that HA-VTE costs the Australian health care system **$1.72 billion**[5]
- PREVENTABLE

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AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

CLINICIAN FACT SHEET

Why focus on venous thromboembolism?

Around 3,400 hospital-acquired episodes of VTE occur each year in Australian hospitals[a]

Patients with this HAC require **21.4 extra days** in hospital compared to those who don't

Each episode of care for this HAC could cost the hospital an **additional $44,384**

28.9 Highest rate of this HAC at Principal Referral Hospitals[1]

9 Aggregate rate of this HAC at Principal Referral Hospitals

Per 10,000 hospitalisations

If all hospitals reduced their rate of this HAC to less than 9 per 10,000 hospitalisations, it would prevent at least **663 episodes of venous thromboembolism**

All facilities should be working to reduce their rates of VTE.

	HOSPITAL-ACQUIRED COMPLICATION	RATE*
1	Pressure injury	10
2	Falls resulting in fracture or intracranial injury	4
3	Healthcare-associated infections	135
4	Surgical complications requiring unplanned return to theatre	20
5	Unplanned intensive care unit admission	na[b]
6	Respiratory complications	24
7	Venous thromboembolism	8
8	Renal Failure	2
9	Gastrointestinal bleeding	14
10	Medication complications	30
11	Delirium	51
12	Persistent incontinence	6
13	Malnutrition	12
14	Cardiac complications	69
15	Third and fourth degree perineal laceration during delivery (per 10,000 vaginal births)	358
16	Neonatal birth trauma (per 10,000 births)	49

a per 10,000 hospitalisations except where indicated
b na = national data not available

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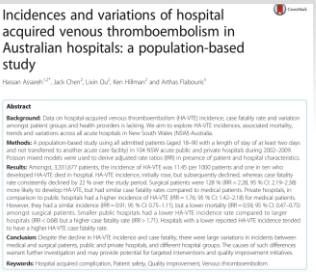

Incidences and variations of hospital acquired venous thromboembolism in Australian hospitals: a population-based study

Hassan Assareh[1,2], Jack Chen[2], Lixin Ou[2], Ken Hillman[2] and Arthas Flabouris[2]

Abstract

Background: Data on hospital-acquired venous thromboembolism (HA-VTE) incidence, case fatality rate and variation amongst patient groups and health providers is lacking. We aim to explore HA-VTE incidences, associated mortality, trends and variations across all acute hospitals in New South Wales (NSW) Australia.

Methods: A population-based study using all admitted patients (aged 18–90 with a length of stay of at least two days and not transferred to another acute care facility) in 104 NSW acute public and private hospitals during 2002–2009. Poisson mixed models were used to derive adjusted rate ratios (RR) in presence of patient and hospital characteristics.

Results: Amongst, 3,331,677 patients, the incidence of HA-VTE was 11.45 per 1000 patients and one in ten who developed HA-VTE died in hospital. HA-VTE incidence, initially rose, but subsequently declined, whereas case fatality rate consistently declined by 22 % over the study period. Surgical patients were 128 % (RR = 2.28, 95 % CI: 2.19–2.38) more likely to develop HA-VTE, but had similar case fatality rates compared to medical patients. Private hospitals, in comparison to public hospitals had a higher incidence of HA-VTE (RR = 1.76, 95 % CI: 1.42–2.18) for medical patients. However, they had a similar incidence (RR = 0.91, 95 % CI: 0.75–1.11), but a lower mortality (RR = 0.59, 95 % CI: 0.47–0.75) amongst surgical patients. Smaller public hospitals had a lower HA-VTE incidence rate compared to larger hospitals (RR < 0.68) but a higher case fatality rate (RR > 1.71). Hospitals with a lower reported HA-VTE incidence tended to have a higher HA-VTE case fatality rate.

Conclusion: Despite the decline in HA-VTE incidence and case fatality, there were large variations in incidents between medical and surgical patients, public and private hospitals, and different hospital groups. The causes of such differences warrant further investigation and may provide potential for targeted interventions and quality improvement initiatives.

Keywords: Hospital acquired complication, Patient safety, Quality improvement, Venous thromboembolism

- N= 3,331,677 NSW patients 18-90 yrs old with LOS > 2 nights
- ICD-10 codes used to identify VTE cases (PE, DVT)
- Overall HA-VTE incidence: 11.4 per 1,000 cases
  - **Surgical patients** accounted for **93.3%** of these cases
  - **Surgical patients 2.3 times more likely** to develop HA-VTE vs medical
  - Similar mortality rates (**9.7%**)

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DVT COMPLICATIONS

Pulmonary Embolism (PE)[6]

- 25% sudden death
- 5% further 7 day mortality

30% 1 week mortality

- 3% chronic thromboembolic pulmonary hypertension

Post Thrombotic Syndrome (PTS)[7]

- Pain, heaviness, swelling of the affected leg, worsened by standing or walking
  - Skin & soft tissue changes → ulceration (severe)
- Incidence:
  - 17% after 1 year, 23% after 2 years, 28% after 5 years, 29% after 8 years
  - Severe PTS: 3% after 1 year, 9% after 5 years

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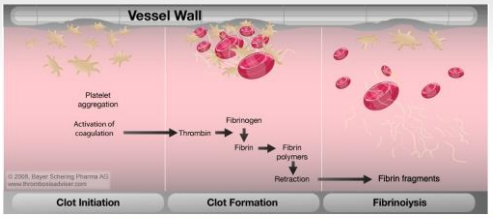
MECHANISM OF VTE



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VIRCHOW'S TRIAD – RISK FACTORS

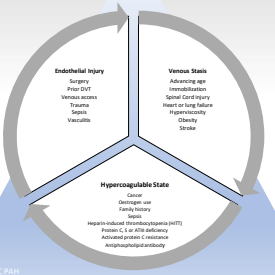

Photo courtesy of Rodney Neale, VTE CNC PAH

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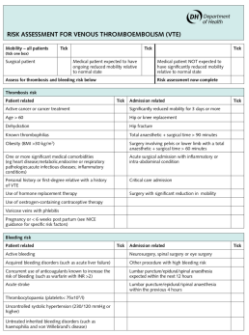
RISK ASSESSMENT

- All surgical patients should be assessed for VTE risk and bleeding risk as soon as possible
- Risk assessment tools
- Based on risk assessment, appropriate VTE prophylaxis can be selected
  - Individualise


RISK ASSESSMENT FOR VENOUS THROMBOEMBOLISM (VTE)

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Ref. (8) NICE 2018

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PATIENT GROUPS AT INCREASED VTE RISK

- Major abdominal
- Total hip arthrop
- Fragility fracture
- Major trauma su
- Traumatic spinal
- Craniotomy
- Cardiac surgery
- Abdominal aorti
- Thoracic surger
- Elective spinal s
- Bariatric surgery
- Ambulatory patie
- Critically ill patients

Incidence of VTE <u>without</u> prophylaxis[9]:

- Hip fracture 45%
- Elective hip replacement 51%
- Total knee replacement 47%
- Multitrauma 50%
- Spinal cord injury 35%
- General surgery 25%
- General Medicine 17%

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VTE PROPHYLAXIS – NON PHARMACOLOGICAL

- Intermittent Pneumatic Pressure (IPC)
  - Calf/foot
- Graduate Compression Stockings (GPC)
  - Thigh/calf
  - Sizing important

Tape Measure → Carton → Packet → Stocking

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VTE PROPHYLAXIS – NON PHARMACOLOGICAL

⚠ Contraindications[10] ⚠

- Severe peripheral arterial disease or ulcers
- Recent skin graft
- Peripheral arterial bypass grafting
- Severe leg oedema or pulmonary oedema from congestive heart failure
- Known allergy to material of manufacture
- Severe local problems on legs (e.g. gangrene, dermatitis, untreated infected wounds, fragile 'tissue paper' skin)

For some patients, IPC is suitable but GCS is contraindicated[10]

- Patients admitted for stroke
- Severe leg deformity or morbid obesity preventing correct fit
- Severe peripheral neuropathy

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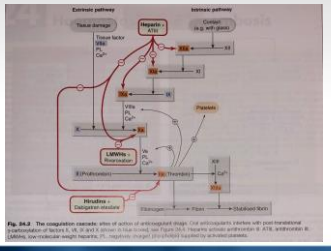
VTE PROPHYLAXIS - PHARMACOLOGICAL



Ref: (11) Rang & Dale

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VTE PROPHYLAXIS – PHARMACOLOGICAL

⚠ Contraindications[10] ⚠

- Patients on therapeutic anticoagulation (UFH, LMWH, DOAC, warfarin with therapeutic INR, danaparoid, bivalirudin, fondaparinux)
- Active major bleeding (2 units or more of blood/blood products transfused in 24 hours)
- Recent clinically significant bleeding within last 48 hrs
- Thrombocytopenia (platelets less than 50 x 10^9/L)
- Inherited or acquired bleeding disorders (e.g. haemophilia)

Relative Contraindications[10]

- Surgical procedures with high bleeding risk (head & neck, neurosurg, ophthal) within the last 2 weeks
- Recent GI or genitourinary bleeding
- Recent CNS bleeding
- Intracranial or spinal lesion deemed by neurosurg to be high risk of bleed
- Uncontrolled systolic hypertension (230/120mmHg or higher)
- Active peptic ulcer &/or active ulcerative gastrointestinal disease
- Severe hepatic disease or acute liver failure

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PHARMACOLOGICAL PROPHYLAXIS

- What medications are used for VTE prophylaxis at your workplace?

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PREFERRED VTE PROPHYLAXIS AGENTS

- As per Queensland Health 2018 VTE Guidelines

Table 2: Pharmacological VTE prophylaxis options

Drug Class	Medication	Notes
LMWH[5]	Dalteparin	Preferred option except in patients with renal impairment or patients at increased risk of bleeding (see 1.7.5)
	Enoxaparin	
UFH	Heparin	Option for patients with renal impairment and patients at increased risk of bleeding (see 1.7.5)
DOAC	Rivaroxaban	Option for VTE prophylaxis following THR or TKR surgery
	Dabigatran	
	Apixaban	
Antiplatelet	Aspirin	Option for **specific orthopaedic patients without additional VTE risk factors** (see 2.2.3, 2.2.4 and 2.2.6 for further detail). Note: The national VTE Prevention Clinical Care Standard includes aspirin "for use in hip and knee replacement surgery only, usually in combination with mechanical methods and in patients without major risk factors for VTE and bleeding."(4)

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SURGERY SPECIFIC RECOMMENDATIONS (ADAPTED FROM NICE GUIDELINES[9])

Surgery	Recommendation	Surgery	Recommendation
Orthopaedic – lower limb	LMWH, while immobilized	**Major Trauma**	IPC, TEDS if not contraindicated. Reassess VTE risk and bleeding risk at least daily. Pharm proph for minimum 7 days if VTE risk >bleeding risk.
Orthopaedic – elective THR	LMWH 10 days then aspirin (75mg or 150mg) 28 days LMWH 28 days + TEDS Rivaroxaban/Apixaban/Dabigatran[11]	**Abdominal Surgery**	IPC & TEDS Pharm proph (LMWH): minimum 7 days, 28 days if major cancer surgery
Orthopaedic - TKR	Aspirin (75mg or 150mg) 14 days LMWH 14 days + TEDS Rivaroxaban/Apixaban/Dabigatran[11]	**Bariatric Surgery**	LMWH for minimuim 7 days (10-15 days if high VTE risk). IPC, TEDS *consider dosing in obesity
Fragility fracture pelvis/hip/proximal femur	LMWH for 1 month. Pre-op proph if surgery is delayed. IPC	**Thoracic Surgery**	LMWH for 7 days if VTE risk > bleeding risk, TEDS/IPC until mobilising
Neurosurgery	Assess bleeding risk. IPC & TEDS. LMWH 24-48hrs post-op dependent on bleeding risk	**Oral Max Fax Surgery**	LMWH for 7 days if VTE risk > bleeding risk, TEDS/IPC until mobilising
Spinal cord injury	Assess bleeding risk. IPC & TEDS. LMWH after 24hrs for 30 days	**ENT Surgery**	LMWH for 7 days if VTE risk > bleeding risk, TEDS/IPC until mobilising

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Note: timing of VTE prophylaxis needs to be considered if regional/epidural anaesthesia is used to prevent the formation of epidural haematomas

Table 7: Timing of anticoagulants and neuraxial puncture or catheter insertion/removal

Drug Class	Medication	Time after medication administration for puncture or catheter insertion/removal	Time after puncture or catheter removal for medication administration
UFH	Heparin		
	Prophylaxis: 15000 units per day maximum	Subcut: 4 to 6 hours	1 hour
	Treatment	IV: 4 to 6 hours Subcut: 8 to 12 hours	1 hour
LMWH[5]	Dalteparin / Enoxaparin		
	Prophylaxis	12 hours NB: If twice daily administration, omit one dose for a 24-hour time interval	4 hours
	Treatment	24 hours	4 hours
DOAC	Rivaroxaban	Extreme caution recommended	
	Prophylaxis: 10mg daily	22 to 26 hours	4 to 6 hours
	Dabigatran	Manufacturer recommends neuraxial catheters are not used	
	Prophylaxis 150-220mg daily	Contraindicated by the manufacturer	6 hours
	Apixaban	Extreme caution recommended	
	Prophylaxis: 2.5mg twice daily	26 to 30 hours	4 to 6 hours
Vitamin K antagonist	Warfarin	Await INR less than or equal to 1.4	After catheter removal

Adapted from: Horlocker, et al. Regional anesthesia in the patient receiving antithrombotic or thrombolytic therapy. Reg Anesth Pain Med 2018;43(3):263-309(16)

[5] Dalteparin is the preferred LMWH for VTE prophylaxis on the LAM . This information is correct as at publication

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HEPARIN

Mechanism of Action	Activates antithrombin III → binds to and inactivates thrombin and factor Xa → anticoagulation
Dose	5000 units subcut BD or TDS (local practice guidelines for extremes of body weight?)
Side Effects	Bleeding (reversed with protamine). Heparin Induced Thrombocytopenia – monitor platelet counts
Administration	Subcut injection or IV infusion (not absorbed from the gut due to charge and large molecular weight)

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LMWH

Mechanism of Action	Activates antithrombin III → binds to and inactivates factor Xa. (smaller molecule compared to heparin so only inhibits factor Xa)
Dose	Dalteparin: 5000 units daily Enoxaparin: 40mg daily *Dose adjustments may be required for extremes of body weight and renal impairment
Side Effects	Bleeding, HITS (more common with unfractionated heparin than LMWH).
Administration	Subcut injection

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ASPIRIN

Mechanism of Action	• Inhibits platelet aggregation by irreversibly inhibiting cyclo-oxygenase, reducing the synthesis of thromboxane A_2 (an inducer of platelet aggregation) for the life of the platelet (7 days)
Dose	75mg – 150mg once daily
Side Effects	Bleeding, GI upset, rash (Stevens-Johnson Syndrome, toxic epidermal necrosis)
Administration	Oral (tablet or dispersible tablet).

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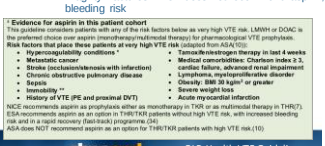
EVIDENCE FOR ASPIRIN AS VTE PROPHYLAXIS

- Controversial
- International Guidelines – different recommendations for aspirin use between guidelines
  - *"for use in hip and knee replacement surgery only, usually in combination with mechanical methods and in patients without major risk factors for VTE and bleeding."* – Australian Clinical Care Standard for VTE Prevention[3]
  - Fragility fractures: NICE does not recommend aspirin, ESA only for low risk VTE with high bleeding risk


Evidence for aspirin in this patient cohort

This guideline considers patients with any of the risk factors below as very high VTE risk. LMWH or DOAC is the preferred choice over aspirin (monotherapy/multimodal therapy) for pharmacological VTE prophylaxis.

Risk factors that place these patients at very high VTE risk (adapted from ASA'10)):

- Hypercoagulability conditions *
- Metastatic cancer
- Stroke (occlusive/venosis with infarction)
- Chronic obstructive pulmonary disease
- Sepsis
- Immobility **
- History of VTE (PE and proximal DVT)
- Tamoxifen/estrogen therapy in last 4 weeks
- Medical comorbidities: Charlson index ≥ 3, cardiac failure, advanced renal impairment
- Lymphoma, myeloproliferative disorder
- Obesity: BMI 30 kg/m² or greater
- Severe weight loss
- Acute myocardial infarction

NICE recommends aspirin as prophylaxis either as monotherapy in THR or as multimodal therapy in THR(7); ESA recommends aspirin as an option in THR/TKR patients without high VTE risk, with increased bleeding risk and in a rapid recovery (fast-track) programme.(34)
ASA does NOT recommend aspirin as an option for THR/TKR patients with high VTE risk.(10)


The NEW ENGLAND JOURNAL of MEDICINE

Aspirin or Rivaroxaban for VTE Prophylaxis after Hip or Knee Arthroplasty

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DOACS

Rivaroxaban	10mg daily for 2 weeks (TKR) or 5 weeks (THR)
Apixaban	2.5mg BD for 10-14 days (TKR) or 32-38 days (THR)
Dabigatran	Initially 110 mg within 1–4 hours of completed surgery, then 220 mg once daily. If dabigatran cannot be started on the day of surgery, give 220 mg once daily for 10 days (TKR) or 28- 35 days (THR). If CrCl 30-50, on amiodarone or verapamil, dose = 150mg daily

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CASE STUDY – MR NV

- Mr NV is admitted to the orthopaedic ward after right total hip replacement. He is a 70 year old male with no known allergies. He is 60kg. eGFR = 75mL/min

Past Medical History
- Depression
- Glaucoma
- Vertigo
- Non-Smoker

Current Medications
- Docusate + Senna 2 BD
- Targin 5/2.5mg BD
- Pantoprazole 40mg mane
- Sertraline 100mg mane
- Paracetamol 1g QID
- Latanoprost nocte both eyes
- Metoclopramide 10mg TDS PRN
- Ondansetron 4mg TDS PRN
- Oxycodone 5-10mg q4h PRN
- Cephazolin 2g TDS (for 3 doses)

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CASE STUDY – MR NV

The ward doctor asks you if they should prescribe VTE prophylaxis for this patient. What would you recommend?

1. Drug?
2. Dose?
3. Duration?
4. Counselling points?
5. PBS criteria?

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CASE STUDY – MR NV

The ward doctor asks you if they should prescribe VTE prophylaxis for this patient. What would you recommend?

1. Drug? Rivaroxaban
2. Dose? 10mg mane
3. Duration? 5 weeks total (including inpatient prophylaxis)
4. Counselling points? Bleeding risk, end date
5. PBS criteria? PBS streamline 4402 *Prevention of VTE, patient must be undergoing a total hip replacement and must require up to 30 days supply to complete a course of treatment.*

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CONCLUSIONS

- HA-VTE causes significant morbidity and mortality for patients
- Preventable with appropriate VTE prophylaxis
- Risk assessment should be done for every patient as soon as able
- Individualise treatment
- Pharmacological AND non-pharmacological treatment options

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