

# Clinical Guideline

## ***Peri-operative bridging of patients with mechanical heart valves undergoing elective surgery***

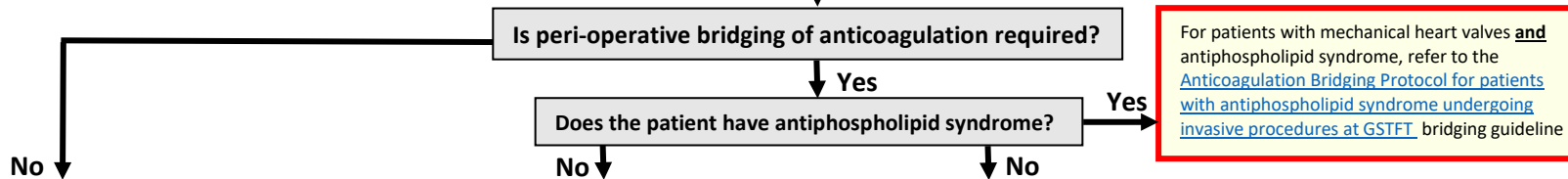
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## Peri-operative bridging of patients with mechanical heart valves undergoing elective surgery

**Identify thrombotic risk of the mechanical heart valve (Box 1). If type of valve unclear, do NOT make any recommendations on management and refer patient back to their managing cardiologist at GSTT or their local hospital**

For patients admitted who will undergo heart valve surgery, refer to [the use of anticoagulation and antithrombotics following heart valve surgery in adult's guideline](#)



**Box 1: Valves**

**A: Valves with low risk thrombogenicity**  
Bileaflet mAVR without AF and normal left ventricular function, Carbomedics, Medtronic

**B: Valves with medium/high risk thrombogenicity**  
Mechanical mitral or tricuspid valve, Older generation mAVR (ball in cage, tilting disc) Other mAVR with concurrent AF and/or reduced left ventricular function Recent CVA/TIA (within 6 months)

Procedure Type	Low Risk Thrombogenicity (Valves A)	Medium/High Risk Thrombogenicity (Valves B)
<b>Minor procedures</b> e.g. dental procedures and cataract surgery	<p><b>Moderate to high bleeding risk procedures in patients with LOW risk thrombogenicity (see Box 1: Valves, A)</b></p> <p><b>Pre-operatively:</b></p> <ul style="list-style-type: none"> <li>Take last dose of VKA <b>4 days</b> prior to procedure (Day-4)</li> <li>Bridge with <b>prophylactic</b> dalteparin according to patient's weight (Table 1 below) starting at 09:00 on Days-3, -2 and -1. Omit dalteparin on day of procedure</li> <li>See Box 2 for advice on monitoring anti Xa levels</li> </ul>	<p><b>Moderate to high bleeding risk procedures in patients with MEDIUM/HIGH risk thrombogenicity (See Box 1: Valves, B)</b></p> <p><b>Pre-operatively:</b></p> <ul style="list-style-type: none"> <li>Take last dose of VKA <b>4 days</b> prior to procedure (Day-4)</li> <li><b>Either:</b> If creatinine clearance <math>\geq 30</math> mL/min, bridge with <b>therapeutic dalteparin</b> (100 units/kg <b>twice daily</b>) rounded to the closest 500 units. Seek advice from thrombosis StR if patient weighs more than 180kg.</li> <li>Start the first dose of twice daily dalteparin at 09:00 on Days-3, -2 and -1.</li> <li>Omit dalteparin on day of procedure (See Box 2 for advice on monitoring anti Xa levels in renal impairment and low body weight)</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>If creatinine clearance <math>&lt; 30</math> mL/min, admit patient on <b>Day -3</b> and commence an <b>unfractionated heparin (UFH) infusion</b>. Refer to the <a href="#">Adult guidelines for Unfractionated Heparin infusions for systemic anticoagulation for APTT 2 – 2.5</a></li> <li>If target INR range 2-3, start UFH infusion when INR <math>\leq 1.8</math>, If target INR range 3-4, Start UFH infusion when INR <math>\leq 2.5</math></li> <li>Stop the UFH infusion <b>4 hours</b> prior to procedure</li> </ul>
<b>Post-op</b>	<p><b>Post-operatively</b></p> <ul style="list-style-type: none"> <li>Administer first dose of dalteparin <b>6 hours</b> post wound closure if haemostasis secure.</li> </ul> <p><b>NB: Timing of re-initiation of bridging therapy is at the discretion of the surgeon if high bleeding risk</b></p> <ul style="list-style-type: none"> <li>Commence VKA therapy as below</li> </ul>	<p><b>Post-operatively</b></p> <ul style="list-style-type: none"> <li>Commence <b>prophylactic</b> dalteparin (see Table 1 for dosing advice) for a maximum of <b>48 hours</b>. Administer the first dose <b>6 hours</b> post wound closure if haemostasis secure.</li> </ul> <p><b>NB: Timing of when to restart dalteparin post-operatively is at the discretion of the surgeon if high bleeding risk</b></p> <ul style="list-style-type: none"> <li><b>After</b> 48 hours, switch from prophylactic dalteparin to the bridging therapy (either therapeutic dalteparin or UFH infusion) the patient was receiving prior to the procedure</li> <li>Commence VKA therapy as below</li> </ul>

**Table 1: Prophylactic dalteparin dosing**

Weight	CrCl $\geq 30$ mL/min (Prophylaxis)	CrCl $\leq 30$ mL/min (Prophylaxis)
$\leq 49$ kg	2500 units OD	2500 units OD
50-99kg	5000 units OD	2500 units OD
100-139kg	7500 units OD	5000 units OD
140-179kg	5000 units BD	5000 units OD
$\geq 180$ kg	Seek advice from the Thrombosis StR	

**Box 2: Anti Xa levels:**

**Anti-Xa level testing in reduced renal function (CrCl  $< 30$  mL/min) and low body weight ( $< 39$ kg)**  
Dalteparin can accumulate in patients with impaired renal function. There is little data on the accumulation of dalteparin in patients with low body weight

**Consider peak and trough anti Xa level testing for patients with low body weight or in any patient with renal impairment if concerned about bleeding or bruising after receiving dalteparin for 7 days**

**Peak anti Xa levels:** Take level 4 hours after dalteparin administration.

**Trough anti Xa levels:** Take level prior to dalteparin administration:

	Therapeutic TWICE daily dosing target range	Prophylactic target range
<b>Peak</b>	0.5 – 0.8 IU/mL	$\leq 0.3$ IU/mL
<b>Trough</b>	$\leq 0.2$ IU/mL	$\leq 0.2$ IU/mL

If anti-Xa levels do not fall into the reference range, contact the Thrombosis StR for advice

**Key:**

AF: Atrial fibrillation  
CrCl: Creatinine clearance  
INR: International normalised ratio  
IU: International unit  
VKA: Vitamin K antagonist e.g. warfarin  
mAVR: Mechanical aortic valve  
UFH: Unfractionated heparin

**Restarting VKA therapy – At discretion of surgeon (usually 24-72 hours post procedure)**

If there is no excessive bleeding (and epidural catheter has been removed), ideally restart on the evening of surgery (obtaining consent from surgical consultant/StR approval first) once oral intake established.

- INR less than 1.5:** Restart with a loading dose of 1.5 x patient's usual dose for 2 days, then continue on patient's usual dose. Check INR on day 3 and adjust dose accordingly as per [Patients already on warfarin - Restarting or adjusting the dose in adult's guideline](#)
- INR 1.5 or greater:** Contact clinical Pharmacist/Thrombosis StR for advice

**Ensure to continue the dalteparin/unfractionated heparin infusion whilst restarting the VKA.**

**Bridging therapy can be stopped when INR above target INR (midpoint of target range) ONCE, or INR in range but below target INR on TWO CONSECUTIVE OCCASIONS**

**Note:** If any medicines that interact with VKAs have been started or stopped during admission, contact the ward pharmacist for advice as the usual maintenance dose may need altering. Refer patient to their local anticoagulation clinic within 3 days of discharge.

Thrombosis StR contact details: Bleep 0122 in hours (Bleep 0294 out of hours and weekends)