

ANTICOAGULATION BRIDGING:
HOPE OR HYPE ?

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DISCLOSURES

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**TOWER BRIDGE: (OFTEN
MISTAKEN FOR LONDON BRIDGE)**



LONDON BRIDGE



MINNEAPOLIS BRIDGE



BRIDGING: A DEFINITION

- Warfarin may require temporary interruption, especially for surgery or a potential invasive procedure (colonic polyp removal).
- Short-term parenteral anticoagulants with rapid onset/ offset are prescribed to reduce the risk of thromboembolism.

IMMEDIATE **ANTICOAGULATION**

1. Unfractionated heparin: target PTT between 60 to 80 seconds
2. Low molecular weight heparins: enoxaparin, dalteparin, tinzaparin
3. Fondaparinux (long $\frac{1}{2}$ -life)
4. Direct thrombin inhibitors (HIT): argatroban, lepirudin, bivalirudin

BRIDGING: A GLOSSARY

- “Bridging In”--Preop
- “Bridging Out”--Postop
- Anticoagulation Intensity
 - “Full” (e.g., Enox 1 mg/kg BID)
 - “Prophylactic”
(e.g., Enox 40 mg/day)

BRIDGING RATIONALE: PRO

- Avoid Thromboembolism
- Usually use LMWH after warfarin discontinuation to avoid prolonged hospitalization (that would be needed) with continuous IV unfractionated heparin

BRIDGING: RATIONALE CON

- Lack of evidence (no RCTs)
- Published reports are cohort studies, without tight protocols
- May increase bleeding complications
- Creates miscommunications, logistical nightmares

BRIDGING AND BLEEDING

A “minor bleed” is not minor for the patient or surgeon:

- Increases incisional pain, •
- Increases hospital LOS,
- Predisposes to infection,
- May require drainage

LMWH BRIDGING: 1999—2005

| <u>Author</u> | <u># (Valves)</u> | <u>Bleeding</u> | <u>TE</u> |
|----------------------|--------------------------|------------------------|------------------|
| Spandorfer | 20 (0) | 15% | 0 |
| Tinmouth | 24 (12) | 8% | 4% |
| Dotan | 20 (3) | 10% | 0 |
| Ferreira | 74 (74) | 12% | 0 |
| Spyropoulos | 84 (27) | 7% | 0 |
| Douketis | 650 (215) | 3% | 3% |
| Kovacs | 224 (112) | 7% | 4% |
| Jaffer | 69 (21) | 4% | 0 |

LMWH BRIDGING: 2006—2008

| <u>Author</u> | <u># (Valves)</u> | <u>Bleeding</u> | <u>TE</u> |
|---------------------------|-------------------|-----------------|-------------|
| REGIMEN (2006) | 901 (246) | 15% | 1.2% |
| PROSPECT (2007) | 260 (0) | 45% | 1.9% |
| Garcia Bridged (2008) | 108 (38) | 13% | 0 |
| Garcia Not Bridged | 1185 (84) | 0.8% | 0.6% |

GARCIA REGISTRY (N=1,293)

- Prospective cohort, 101 sites (CoumaCare®)
- Mostly office-based, community MDs
- 1,293 warfarin outpatient interruptions (≤ 5 days in 84% procedures) in 1,024 pts
- Warfarin indications included: AF (n=550), VTE (n=144), mechanical valves (n=132)
- Most common procedures: colonoscopy (n=324), dental (n=323), eye (n=116)
- Only 7% “high risk” pts: MVR, VTE within 4 weeks, active cancer
- Average age: 72 years
(Garcia DA. Arch Intern Med 2008; 168: 63-69)

GARCIA BRIDGING (N=108)

- Only 108/ 1,293 bridged (8.3%)
- Used LMWH to bridge
- Valves (29%)
- LV Dysfunction (16%)
- VTE (11%)
- Stroke (4.7%)
- AF (2.5%)

(Garcia DA. Arch Intern Med 2008; 168: 63-69)

BRIDGING and THROMBOEMBOLISM

| | <u>Bridge</u> <u>(N=108)</u> | <u>No bridge</u> <u>(N=1,185)</u> |
|-------------------|---|--|
| T-Embolism | 0.0 % | 0.6 %* |

***3 strokes, 2 PEs, 1 DVT, 1 isch bowel
2 of 7 high risk: active CA, recent DVT**

(Garcia DA et al. Arch Intern Med 2008; 168:63-69)

BRIDGING and BLEEDING

| Bleeding | Bridge | No bridge |
|---------------------------------|---------------|------------------|
| Major hemorrhage | 3.7 %* | 0.2 % |
| “Significant” hemorrhage | 9.3 % | 0.6 % |

***2 GI, 1 SDH, 1 soft tissue**

(Garcia DA et al. Arch Intern Med 2008; 168:63-69)

GARCIA SUMMARY (N=1,293)

- TE is uncommon in low or intermediate risk patients interrupting warfarin for \leq 5 days.
- Bridging may cause frequent bleeding complications.
- Bridging may be unnecessary for the vast majority of patients.
- Routine bridging may do more harm than good.

(Garcia DA. Arch Intern Med 2008; 168: 63-69)

PROSPECT REGISTRY (N=260)

- Prospective cohort at 24 sites
- Only 15% had major surgery
- Warfarin Rx for AF or DVT
- Excluded heart valves, stroke history
- Enoxaparin bridging once daily

(Dunn AS. JTH 2007; 5: 2211-2218)

PROSPECT BRIDGING REGIMEN

- Warfarin stopped 5d preop
- Enoxaparin 1.5 mg/kg/day started 3d preop
- Warfarin restarted POD # zero
- Enoxaparin 1.5 mg/kg/day restarted 12-24h postop “provided no active surgical bleeding”

(Dunn AS. JTH 2007; 5: 2211-2218)

PROSPECT BRIDGING RESULTS

- 1.9% TE: (2 TIAs, 1 leg artery embolism, 1 leg ischemia, 1 PE)
- 3.5% Major Bleeding: (4 knee sites, 2 GI, 1 abd wall hematoma, 1 hip site, 1 aortofem site)
- 41.5% Minor Bleeding

(Dunn AS. JTH 2007; 5: 2211-2218)

CRITIQUE OF PROSPECT BRIDGING REGISTRY

- Strength: uniform bridging regimen
- Findings: surprisingly high rate of TE (1.9%) despite LMWH and high rate of major bleeding (3.5%)

(Dunn AS. JTH 2007; 5: 2211-2218)

REGIMEN REGISTRY (N=901)

- Prospective cohort at 14 sites
- 246 (27%) had mechanical valves
- 44% underwent major surgery
- Most bridging was BID enoxaparin
- >90% bridging was continued postop

(Spyropoulos AC. JTH 2006; 4: 1246-1252)

REGIMEN BRIDGING RESULTS **(N=832 Receiving Postop Bridge)**

- 1.2% TE: (3 strokes, 3 TIAs, 2 DVTs, 1 valve, 1 leg embolism)
- 3.7% Major Bleeding:
- 11.4% Minor Bleeding

(Spyropoulos AC. JTH 2006; 4: 1246-1252)

REGIMEN REGISTRY: TAKE HOME (N=901)

- Surprisingly high TE rate
- Despite BID dosing, major bleeding rate remained high (3.7%)
- Postop bridging must increase bleeding risk

WHOM DO I BRIDGE ?

- Mitral Stenosis patients
- Prior stroke
- VTE within 3 months
- Prior TE during perioperative warfarin interruption

“BRIDGING”

1. UFH
 - A. Multiple prosthetic valves
 - B. “Advanced” MV disease
 - C. Inability to follow outpatient instructions
2. LMWH
 - A. Convenient
 - B. Economical
3. Fondaparinux: long half-life

SZG PREOP BRIDGING

1. Omit warfarin for 5 preop days.
2. Begin LMWH on preop day # 4
3. Continue LMWH preop days #3, #2, #1 (morning only)

SZG POSTOP BRIDGING

1. Resume warfarin on POD # zero (most TEs occur when warfarin is held postop)
2. Hardly ever resume full-dose LMWH
3. If “bridging out” with LMWH, prescribe preventive doses (e.g., enoxaparin 40 mg daily) until INR is therapeutic

EXCEPTIONALLY HIGH RISK PATIENTS

- Prior stroke or MV disease, especially in setting of warfarin interruption
- CKD or “clinical fragility” precluding standard dose LMWH
- Consider preop hospitalization for 2-3 days with standard IV continuous infusion heparin

**2008 ACCP CHEST
GUIDELINES TO OMIT
BRIDGE**

1. St. Jude's AVR (no AF, no stroke risk factors)
2. Hardly ever resume full-dose LMWHAF with CHADS Score 0-2
3. Single VTE > 12 months ago

(CHEST 2008; 133: 299S-339S)

REMAINING QUESTIONS

1. When is "bridging" indicated?
2. Should "bridge" be with preventive or full dose (once or twice daily LMWH?) anticoagulants?
3. Should we "bridge out" postop, a time when bleeding risk is maximal?
4. Are we "bridging" too often, especially in non-high risk patients?