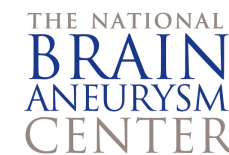




The Use of Bivalirudin in Neurosurgical Patients at High Risk for Heparin Anticoagulation

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Introduction

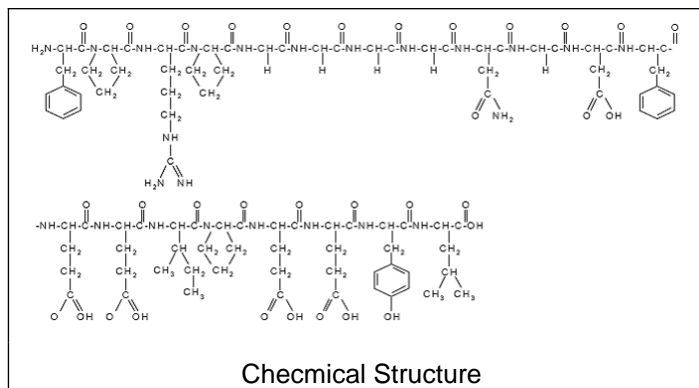
Bivalirudin is an ultra short-acting direct thrombin inhibitor which has been used in place of heparin in selected settings. We describe our preliminary experience with the use of bivalirudin in patients who required anticoagulation for a deep vein thrombosis, a prosthetic heart valve, or a hypercoagulable state but were felt to be at high risk for the use of heparin.

Methods

Eight patients in our neurocritical care unit required anticoagulation but were felt to be poor candidates for heparin either due to heparin-induced thrombocytopenia (HIT) or due to high risk for intracranial hemorrhage. A standard protocol was utilized for bivalirudin using a loading dose of 0.75mg/kg followed by a continuous infusion of 0.15mg/kg/hr. Serial aPTT levels were checked on a routine basis to monitor therapeutic effect. The bivalirudin infusion was continued for a period of 2 days to 2 weeks prior to starting coumadin therapy.

	Age	Sex	Diagnosis	Days of use
1	73	F	SAH, DVT with PE	34
2	43	M	SAH, ECIC Bypass, DVT with PE	10
3	58	F	SDH, MVR, Left atrial thrombus	3
4	62	M	ICH, DVT	2
5	86	M	SDH, A. Fib with TIAs	2
6	41	F	SAH, Dural VT	15
7	28	M	SD Empyema, DVT with PE	2
9	63	F	ICH, MVR	2

Characteristics



Results

These patients were in the early postoperative period (within 48 hours) following craniotomy, had suffered a recent large hemispheric infarct with hemorrhagic conversion, or had presented with an acute intracerebral hemorrhage. In this small series of patients, no intracranial hemorrhagic complications were encountered. No patients demonstrated progressive systemic thrombotic issues while on bivalirudin.

Conclusions

Based on these findings, bivalirudin may represent a reasonable alternative in patients for whom heparin anticoagulation is contraindicated. A larger multicenter trial of bivalirudin in this setting may be appropriate.

PK Parameters in patients with renal impairment

Renal Function (GFR, ml/min)	Clearance (mL/min/kg)	Half-life (min)
Normal (≥ 90)	3.4	25
Mild low (60-89)	3.4	22
Moderate low (30-59)	2.7	34
Severe low (10-29)	2.8	57
Dialysis Dependent (without dialysis)	1.0	3.5 hours

PK Values

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of bivalirudin as an alternative to heparin in high risk neurosurgical patients, 2) Discuss management strategies for neurosurgical patients requiring anticoagulation in the early postoperative setting, 3) Identify treatment options for anticoagulation of patients with acute intracerebral hemorrhage.

References

1. Bivalirudin. Thromb Haemost 2008;99:830-839
2. Bivalirudin use during PCI for stent thrombosis in a patient with subacute intracranial hemorrhage. J Invasive cardiol. 2009;21:136-138