

Title: DOES POSTOPERATIVE EPIDURAL ANALGESIA REDUCE DEEP VEIN THROMBOSIS?

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Epidural (EA) and spinal anesthesia decrease deep vein thrombosis (DVT) rates following total hip and total knee arthroplasty.^{1,2} It is unknown whether prolonging the epidural effect with postoperative epidural analgesia (POEA) further reduces DVT rates. A retrospective review of 479 consecutive unilateral primary cemented bicondylar total knee arthroplasties performed by three surgeons from July 1986 until December 1989 was performed to determine the influence of POEA on DVT rates. 103 cases were excluded because venography was not performed. All cases received lumbar epidural anesthesia with 2% lidocaine or 0.75% bupivacaine, intravenous sedation with midazolam and fentanyl, nasal oxygen, plus radial artery and pulse oximetry monitoring intraoperatively. Postoperatively patients were either discharged from the Postoperative Anesthesia Care Unit (PACU) to the floor with intermittent intramuscular narcotics for postoperative analgesia (n=170) or kept in a PACU for 18-48 hours on a continuous infusion of

bupivacaine (5-12.5 mg/hr)/fentanyl (10-50 micrograms/hr) (n=206). Allocation to postoperative analgesia was not randomized, but based on bed availability in the PACU and/or physician preference. Postoperatively all patients received aspirin (325 mg. BID), and had an operative limb venogram on the fourth or fifth postoperative day. Positive venograms were interpreted by a radiologist and classified as calf or proximal (popliteal, femoral, or iliac) DVT. Differences between groups were analyzed by unpaired T-test or Chi-Square. Results: The DVT rate was 43% (162 of 376). 7 had proximal clots (2%). There was no significant difference in DVT rates between patients receiving POEA (41.7%) or intramuscular narcotics (44.1%). Patients receiving POEA were somewhat older (69.6 vs. 67.1, p=0.02) and were more likely to have had a history of CHF (10.2% vs. 3.5%) but were otherwise similar. Positive DVT was not related to age, ASA, obesity, ischemic heart disease, hypertension, smoking history or duration of surgery but was more common in patients receiving lidocaine (46 of 89 - 57.7%) than bupivacaine (111 of 287 - 39.8%) (p=0.03).

Postoperative analgesia with local anesthesia does not appear to decrease DVT rates following total knee arthroplasty. The difference in DVT rates between lidocaine and bupivacaine may reflect the longer duration of postoperative sympathetic blockade with bupivacaine or perhaps dissimilar coagulation effects of these local anesthetics.

- References:**
1. Anesthesiology (1989) 71: No. A1158
 2. J.B.J.S. (1989) 71 B: 181-185

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TITLE: EPINEPHRINE VS PHENYLEPHRINE: EFFECTS ON RENAL AUTOREGULATION DURING EPIDURAL HYPOTENSIVE ANESTHESIA

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Little is known about renal autoregulation(RA) during controlled hypotension(CH). After institutional approval and informed consent, we studied renal function preoperatively and during epidural hypotensive anesthesia, at mean arterial pressures(MAP) of 50 and 60mmHg (sequence randomly assigned). Patients were randomly assigned to receive either low dose epinephrine(Epi) (<0.1mcg/kg.min) or phenylephrine(Phe) (<0.5mcg/kg/min) to maintain MAP. Following placement of radial and pulmonary artery catheters and bladder catheter under sedation, diuresis was established with 10 cc/kg of Ringer's lactate. Inulin clearance(glomerular filtration rate(GFR)) and PAH clearance(effective renal plasma flow(ERPF)) were measured from 1 hr urine samples. Serum samples for inulin, PAH, Hct, and plasma renin activity(PRA) were collected at the midpoint of each urine collection. Epidural anesthesia was induced with bupivacaine 0.75%, 15-25cc to achieve a sensory level of T2-T4. Hemodynamics were measured every 30 min. Results were analyzed using ANOVA and p<0.05 was considered significant. ERPF and RBF were maintained during CH in the Phe group, but decreased in the Epi group(Table). GFR tended to

decrease with decreasing MAP in both groups, achieving statistical significance only at MAP of 50mmHg in the Epi group. PRA was unchanged from baseline in spite of hypotension in Phe treated patients, while PRA rose during CH with Epi.

While our sample size is small, our results indicate that infusion of low dose Phe during epidural hypotensive anesthesia is associated with normal renal blood flow, whereas, patients receiving Epi had significantly lower RBF. Epi, by stimulating renin secretion, causes angiotensin II-mediated afferent arteriolar vasoconstriction, thereby decreasing RBF. In contrast, Phe patients, in response to lowered Na delivery to the distal tubule from CH, exhibit afferent arteriolar vasodilation(i.e. intact glomerulo-tubular feedback). This can occur because of renal denervation and minimal renin secretion in spite of hypotension.

		BASELINE		60	50
GFR (mL/min)	EPI	76.9 ± 20.4	47.8 ± 13.6	29.4 ± 9.4	
	PHE	58.3 ± 17.3	45.3 ± 21.5	35.7 ± 26.8	
ERPF (mL/min)	EPI	401 ± 105	262 ± 72*	165 ± 70*	
	PHE	405 ± 227	469 ± 201	436 ± 273	
RBF (mL/min)	EPI	608 ± 178	371 ± 99*	230 ± 93*	
	PHE	615 ± 339	663 ± 265	610 ± 386	
FF	EPI	0.20 ± 0.05	0.19 ± 0.04	0.19 ± 0.06	
	PHE	0.17 ± 0.08	0.10 ± 0.02†	0.08 ± 0.02†	
RBF as % CO	EPI	9.3 ± 2.7	5.6 ± 1.3*	4.1 ± 1.9*	
	PHE	12.0 ± 4.9	18.3 ± 6.4†	17.1 ± 10.2†	
RVR (R units)	EPI	165 ± 62	157 ± 75	220 ± 110	
	PHE	200 ± 120	100 ± 48	101 ± 75	
PRA (ng/mL/hr)	EPI	0.7 ± 0.5	3.3 ± 1.5*	5.0 ± 1.0*	
	PHE	1.1 ± 0.6	0.7 ± 0.74†	1.6 ± 2.4†	
		† p<0.05 vs EPI		* p<0.05 vs BASELINE	

† p<0.05 vs EPI * p<0.05 vs BASELINE