CLINICAL COMMENTARY

Co-Management of Hypertension in the Neurosurgical Patient for the Hospitalist

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Introduction

Co-management of surgical patients by hospitalists has become increasingly common since Zuckerman first described the effects of an interdisciplinary team approach to the hip fracture patient in 1992.[1] Auerbach first reported co-management in neurosurgical patients at the University of California San Francisco Medical Center in 2011.[2] A consultative service on neurosurgical patients managed by a small cohort of hospitalists has existed at Ronald Reagan UCLA Medical Center since 2011. This article reviews management of hypertension in the neurosurgical patient.

Hypertension

Although hypertension is a common post-operative problem in the neurosurgical population, there are no established best practice patterns for treatment of hypertension in the neurosurgical literature. Discussion with the neurosurgical team is necessary to define treatment goals. Prior to initiating treatment, the etiology of the hypertension should be evaluated and any underlying conditions treated.

Differential diagnosis of post-operative hypertension:

The differential diagnosis of post-operative hypertension includes essential hypertension, postoperative pain, Cushing's reflex, iatrogenic etiologies, and secondary hypertension. Review of home medications is important as the home antihypertensive regimen may be held in the immediate postoperative setting. Pain should be well-controlled prior to initiation or escalation of an antihypertensive regimen. Pain-related hypertension may be more problematic in patients treated with chronic narcotics in particular those with chronic back pain undergoing spinal surgery or those with chronic headaches from pseudotumor cerebri undergoing shunt revision. In these cases, consultation with pain management may be beneficial. Cushing's reflex is a reaction to increased intracranial pressure (ICP) characterized by elevated blood pressure, bradycardia and irregular respiration, or apnea. In this case, the underlying neurosurgical issue should be addressed. Iatrogenic etiologies of hypertension should also be considered in the neurosurgical patient treated with salt tablets, mineralocorticoids such as fludrocortisone, corticosteroids with mineralocorticoid activity, and hypertonic saline. Where possible, these agents should be tapered off in the hypertensive patient.

Secondary arterial hypertension is rare, representing 5-10% of the hypertensive population. Common etiologies of secondary hypertension include obstructive sleep apnea (OSA), kidney disease, renal artery stenosis (RAS), and primary hyperaldosteronism.[3] In the neurosurgical population, etiologies of secondary hypertension include OSA in pituitary tumor patients undergoing endoscopic trans-nasal trans-sphenoidal (TNTS) surgery, RAS in carotid stenosis patients undergoing carotid endarterectomy (CEA), and pheochromocytoma in neurofibromatosis patients undergoing resection of a schwannoma.

Hypertension guidelines:

The latest hypertension guidelines, the JNC 8, recommend more lenient blood pressure control in older patients. Patients >60 years old should be treated to a goal blood pressure of less than 150/90 mm Hg. Hypertensive patients age 30 through 59 years old should be treated to a goal <140/90 mm Hg.[4] However, these guidelines were developed as a guide for management of blood pressure in the outpatient setting.

Blood pressure management in neurosurgery:

In the neurosurgical patient, tight blood pressure goals are set after elective tumor resection, AVM resection or unruptured aneurysm clipping to prevent bleeding in the surgical bed. Strict blood pressure control is maintained with IV medication for 24-48 hours followed by transition to an oral regimen. Hospitalists may be involved in selection and tailoring of the oral antihypertensive regimen. Calcium channel blockers and ACE-inhibitors (or ARBs) are options for initial therapy. Furosemide and hydrochlorothiazide are typically avoided due to risk of hyponatremia. Hydralazine has complex effects on the brain, including increased ICP and increased cerebral blood flow. Amlodipine is a safe and effective agent.[5] Clonidine has an unclear effect on cerebral blood flow. A significant adverse effect of clonidine includes the risk of rebound hypertension. Beta blockers do not alter cerebral blood flow.[6] However, beta blockers should not be used when treating patients with Cushing's response due to the risk of worsened bradycardia.

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