

Cerebral Herniation Secondary to Elevated Intracranial Pressure in a Patient with Cryptococcal Meningitis

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INTRODUCTION

Cryptococcal Meningitis is an AIDS associated illness that typically occurs in individuals with severe immune suppression. It is a fatal disease if left untreated. Current IDSA recommendations consist of a two week induction course with amphotericin B at 0.7/mg/kg/daily and flucytosine at 25mg/kg/q6hrs. This is followed by a consolidation course of fluconazole at 400mg/day for 8 weeks and then maintenance therapy of 200mg/day.

Abnormal mental status is one of three factors identified as a predictor of high mortality during anti-mycotic therapy. Since elevated intracranial pressure (ICP) is thought to be a common cause of alteration in mental status, current therapy also includes management of ICP.^{1,4}

CASE SUMMARY

A 40 year old Latino man diagnosed with HIV and hepatitis C infection one month prior presented to the emergency department with intermittent headaches, lethargy, and tactile fevers for 8 days.

On physical examination, the patient was afebrile, alert, oriented, and without focal neurologic findings. Computed tomography of the brain revealed calcifications consistent with old neurocysticercosis, without edema, mass effect, or hydrocephalus.

Lumbar puncture (LP) revealed an opening pressure of 11cmH₂O, WBC count of 6 cells/mm³, protein 80 mg/dl, glucose 10 mg/dl; an India Ink stain demonstrated many encapsulated yeast forms. Additional studies included a CSF cryptococcal antigen titer of 1:32,768; CSF and blood cultures grew *Cryptococcus neoformans*. Intravenous amphotericin B (0.7mg/kg/day) and oral flucytosine (25mg/kg/q6hrs) were initiated in the ED.

On hospital day 4, the patient was noted to have nystagmus; a repeat LP revealed an opening pressure of 27cmH₂O, declining to 11cmH₂O after withdrawal of 17mLs CSF. Overnight, the patient became somnolent but arousable. A repeat CT scan of the brain was unchanged. Subsequent daily LPs continued to reveal elevated opening pressures from 50cmH₂O to >55cmH₂O.

On hospital day 7, the patient became unresponsive, hypotensive and tachycardic, and underwent endotracheal intubation; a dopamine drip was initiated for blood pressure support. LP revealed an opening pressure >55cmH₂O. Repeat CT scan of the brain revealed diffuse cerebral swelling with loss of cisternal spaces and evidence of tonsillar and transtentorial uncal herniation. Neurosurgical intervention was deferred due to the patient's poor prognosis. On hospital day 8, the patient was declared brain dead, and care was withdrawn.

DATA/IMAGES

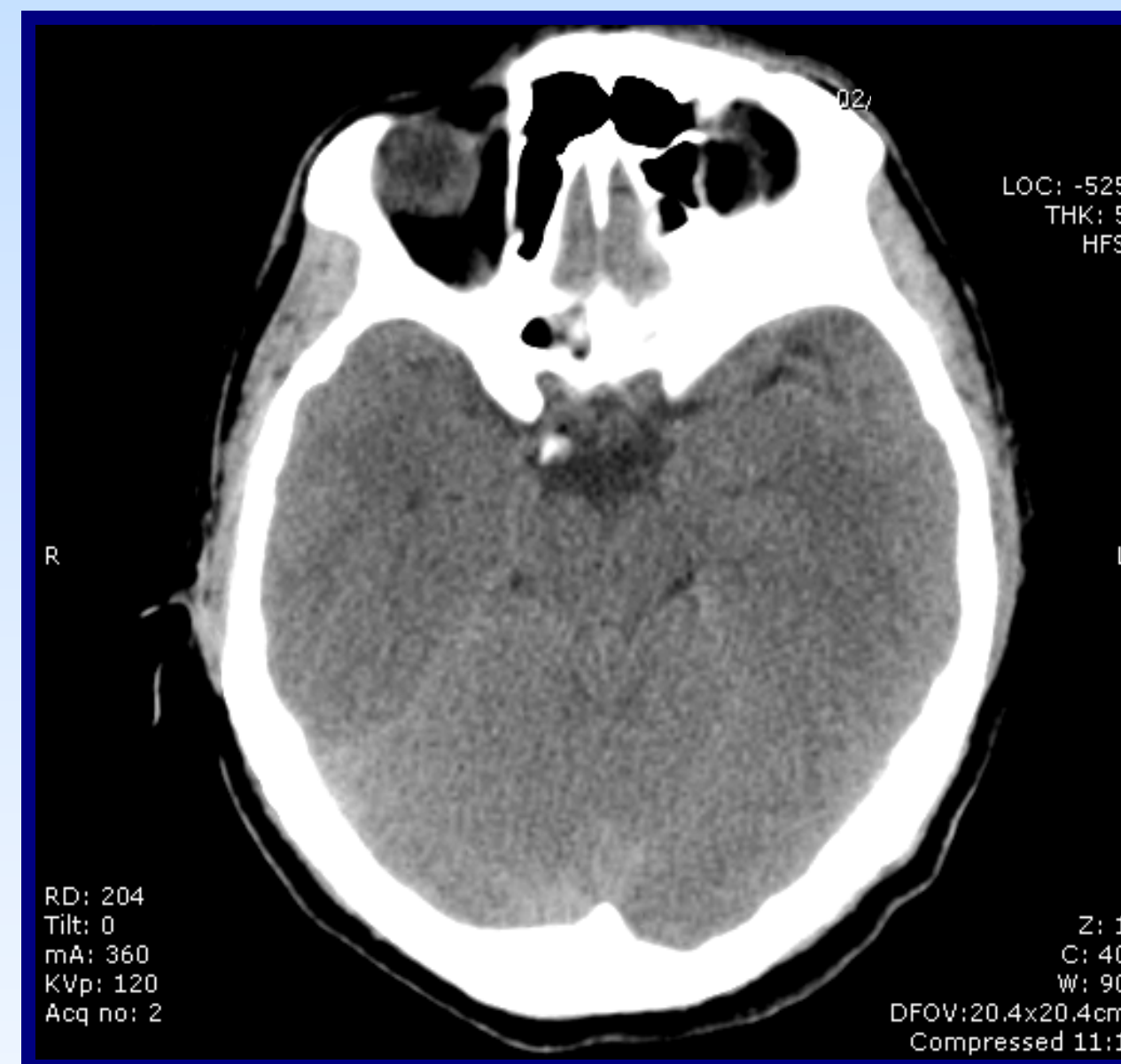
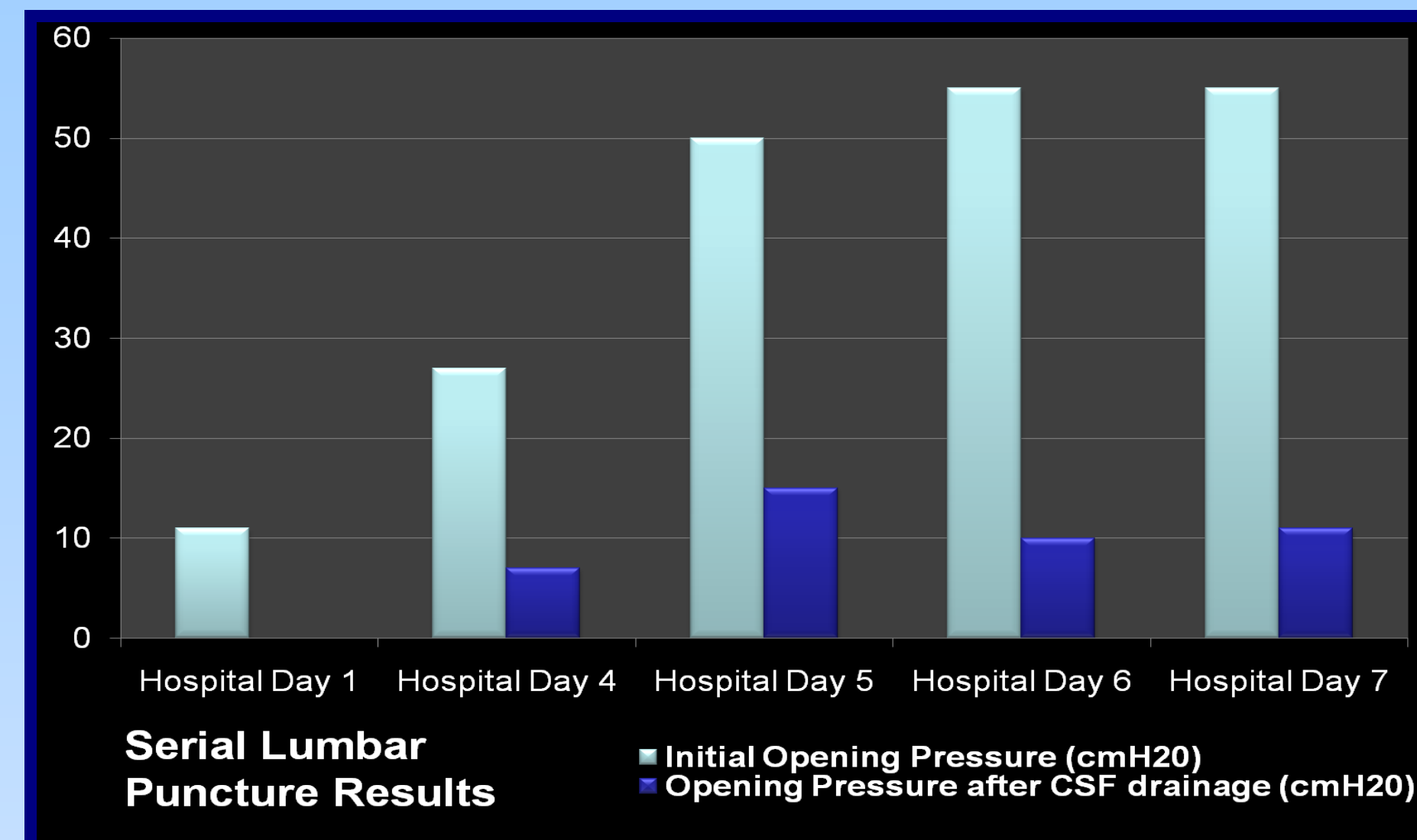


Figure 1. Hospital Day 1: No edema is noted. There is no localized mass effect and no hydrocephalus.

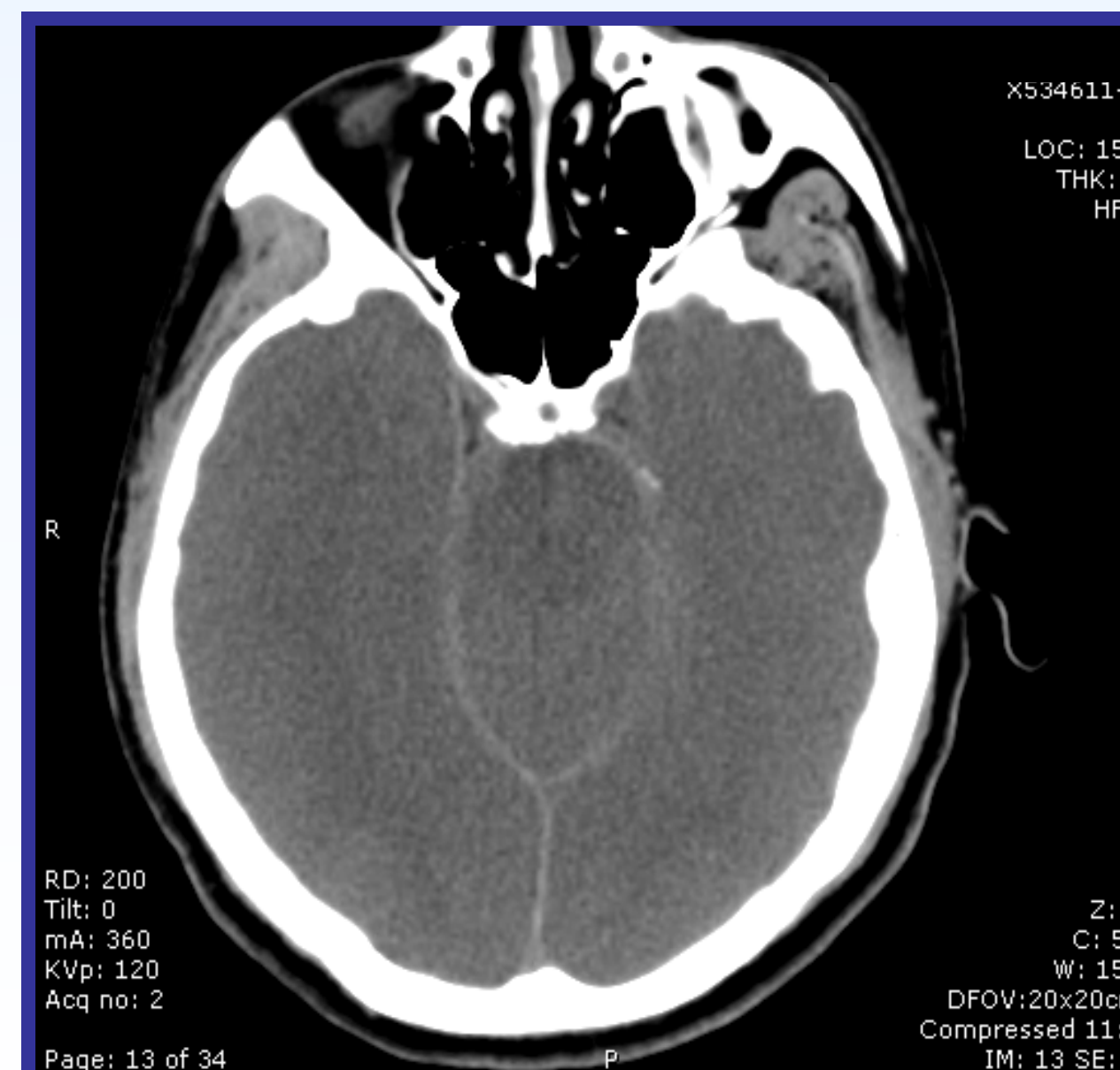


Figure 2. Hospital Day 7: There is diffuse brain swelling with effacement of cerebral sulci, compression of lateral ventricles, and near complete obliteration of the suprasellar cistern. Furthermore, there is effacement of the cisterna magna indicative of tonsillar herniation.

DISCUSSION

Elevated intracranial pressure (pressure >20cmH₂O) is a well known complication of AIDS-associated cryptococcal meningitis. The etiology of the elevated ICP is unclear, but is thought to be the result of increased vascular permeability, cerebral edema from cytokine-induced inflammation, and impaired reabsorption of CSF in the arachnoid villi due to a high fungal burden.²

The NIAID Mycoses Study Group and the AIDS Clinical Trials Group identified abnormal mental status as one factor that predicted increased mortality of patients during antifungal therapy.¹ Elevated intracranial pressure is thought to be a common etiology of altered mental status.⁴ Consequently, the current Infectious Disease Society of America (IDSA) guidelines recommend aggressive management of elevated intracranial pressure with daily lumbar punctures in order to reduce the opening pressure to <20cmH₂O or 50% of initial opening pressure.^{1,4}

Despite undergoing treatment according to IDSA guidelines, the patient presented in this case underwent rapid neurologic decompensation, with evidence of cerebral edema and tonsillar and transtentorial uncal herniation, a rare but documented occurrence.³ Once it was determined that the patient had elevated opening pressures consistent with increased ICP, daily lumbar punctures were initiated per IDSA guidelines.¹ However, over ensuing days, the CSF opening pressure continued to rise. Placement of an external lumbar drain or ventriculoperitoneal shunt may have provided relief of elevated ICP.

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