Invasive vs. Non-invasive Intracranial Pressure Monitoring in Severe Traumatic Brain Injury: A Case Report

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INTRODUCTION: Traumatic brain injury (TBI) is a leading cause of disability in the United States, contributing to approximately 30% of injury-related deaths. The gold standard to prevent TBI complications requires invasive intracranial pressure (ICP) monitoring; however, the efficacy and safety of invasive measures remains controversial, and noninvasive ICP monitoring would be less risky if equally effective.

CASE DESCRIPTION: This case report describes management of a 65-year-old male with severe TBI and the evidence regarding invasive vs. noninvasive ICP monitoring to prevent complications. The patient sustained injuries after falling 20 feet off his roof. Several complications occurred during his hospitalization including inability to maintain ICP within normal limits, fever, and hospital acquired pneumonia. The patient was predicted to have long-term disability related to his TBI.

DISCUSSION: Invasive ICP monitoring requires the placement of catheters within the brain cavity, which carries the risk of infection, hemorrhage, malfunction, obstruction, or malposition. Non-invasive interventions do not carry this risk, but data regarding its efficacy have not been established. Current research is inconclusive as to whether the use of invasive means is superior to less invasive means to control ICP and, unfortunately, few randomized controlled trials (RCTs), prospective case-cohort, or cohort studies have been conducted. Thus, more research with stronger methodology and larger samples sizes would be needed to justify any guideline or protocol changes.

CONCLUSION: Currently, there is not enough evidence to support replacing invasive ICP monitoring with noninvasive ICP monitoring for treatment of severe TBI; however, noninvasive ICP monitoring is a viable option when invasive ICP monitoring cannot be used.