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‘A nail in the Brain’ - Delayed traumatic pseudoaneurysm

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A 28-year-old male presented to the emergency department after an accidental nail gun injury to his head at work. On presentation, he was awake, alert with no neurological deficit. Computed tomography (CT) of the head revealed a nail (8cm length $\times$ 0.7cm width) entering skull from the left frontal bone, traversing the left frontal lobe and terminating in the right lateral ventricle with minimal hemorrhage (Panel A, B). Digital subtraction cerebral angiography prior to nail extraction did not identify any vascular injury (Panel D). Patient then underwent craniotomy for nail extraction and control of cortical and dural bleeding. Post-operatively patient did not recover consciousness and developed sinus bradycardia. Emergent CT head revealed extensive intraventricular and subarachnoid hemorrhage with hydrocephalus (Panel C). Emergent external ventricular drain was placed followed by emergent repeat cerebral angiogram which showed a 3-mm right pericallosal traumatic pseudoaneurysm (Panel E). This was embolized successfully (Panel F). The patient was treated with broad-spectrum antibiotics and tetanus vaccination and made a complete neurological recovery. Even in the setting of negative initial angiography, patients with penetrating head injury should be closely monitored for delayed traumatic pseudoaneurysms.

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Panel A, B: Computed tomography (CT) of the head showing the nail traversing from the left frontal bone to the right lateral ventricle. Panel C: CT demonstrating intraventricular hemorrhage in the lateral ventricles causing hydrocephalus. Panel D: Digital subtraction angiography (DSA) before nail removal. Panel E: DSA after nail removal showing pseudoaneurysm (black arrow) of the pericallosal branch of the anterior cerebral artery. Panel F: DSA after embolization of the distal right pericallosal artery pseudoaneurysm and sacrificing the distal pericallosal artery (white arrow head) proximal and distal to the aneurysm to prevent recurrent bleeding.