Intra-cranial Hypertension Following Gunshot to the Torcula: Case Report and Literature Review

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Penetrating gunshot wounds (GSW) to the brain are often accompanied by intracranial hemorrhage, depressed skull fracture and cerebral edema often causing intracranial hypertension and malignant cerebral edema.

Idiopathic intracranial hypertension is a phenomenon that has been linked to venous sinus narrowing and obstruction.

We present a rare case of progressive papilledema and symptomatic, worsening intracranial hypertension in a neurologically intact patient after a GSW-induced comminuted fracture over the torcular.
Methods

Using a systematic search protocol of the PubMed database, we extracted and reviewed all published human reports of GSW-induced fractures over the superior sagittal sinus causing cerebral venous outflow obstruction and intracranial hypertension.

Literature search revealed several reports of depressed traumatic fractures and one other case of GSW-induced fracture over the superior sagittal sinus causing cerebral venous outflow obstruction and intracranial hypertension.

There were no reports of cases where the confluence of sinuses was involved.
Case Review

A 27 year old male was brought into the hospital after a self-inflicted Gun Shot Wound to the posterior head.

On presentation there were no neurological deficits.

Figure 1. Computed tomography venogram (axial): bullet impacted in occipital bone.
Figure 2. Computed tomography venogram (sagittal): impacted bullet, tapering sinus.

Figure 3. Computed tomography venogram (3-dimensional reconstruction): tapering sinuses.
Results

The patient failed initial conservative management and developed worsening diplopia, abducens palsy and papilledema, concerning for increased intracranial pressure.

Occipital/sub-occipital craniectomy was performed with elevation of depressed skull fracture, decompression of dural venous sinus, removal of bullet and mesh cranioplasty.

Repeat ophthalmology examination post-operatively showed resolution of diplopia and optic disc edema.
Discussion

Various clinical signs and symptoms are reported, all of which are secondary to increased intra-cranial pressure; headaches, nausea, vomiting, dizziness, visual field defects and papilledema. No predictors of clinical course are known which is variable.

Medical management aimed at decreasing intra-cranial pressure is the first line of therapy. Diuretics, anti-coagulants or anti-platelet agents, steroids, repeated lumbar taps and barbiturate coma have all been employed, to various degree of effectiveness and as such, there is no consensus over the therapy of choice.

Patients who are symptomatic despite medical therapy benefit from surgical decompression.

Initial medical management, if possible, plays an important role as it gives some time for scar tissue to form around the site of injury which may help to protect the sinus from injury during surgery.

If it is difficult to remove all the bone over the sinus due to scar tissue, drilling it down to an eggshell thickness can be enough to decompress the sinus and lead to symptomatic improvement,
Summary Points

For injuries over venous sinuses secondary to depressed skull fractures causing intra-cranial hypertension, medical management aimed at decreasing intra-cranial pressure is the first line of therapy.

Majority of patients respond to conservative management.

Surgical management can be safely and effectively implemented when conservative management fails to alleviate symptoms.