Surgical Debridement vs. Bedside Washout of Gunshot Wounds to the Head: A Retrospective Analysis

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ABSTRACT

Learning Objectives

1) Identify subset of patients in which bedside washout of GSW to the head could be considered as an alternative to surgical debridement
2) Compare the outcomes in GSW patients following surgical debridement and bedside washout

Introduction

Gunshot wounds to the head (GSWH) are the most common cause of penetrating brain injury. The literature argues for surgical debridement of the wound with removal of accessible bone fragments. Debridement is thought to lead to decreased risk of infectious complications and some authors believe it may decrease seizure risk. However, with the risks of surgery and the uncertain benefit of this approach in the civilian population we have treated select patients with a more conservative approach including bedside washout of any entry and exit wounds and a course of antibiotics. Here we present our experience with this more conservative approach to GSWH.

Methods

In patients presenting to our level 1 trauma center with GSWH, following physical exam and review of imaging, we treated patients either with surgical debridement or bedside washout, without removing bone fragments, and a short course of CNS-penetrating antibiotics. The conservative approach was favored in patients with initial high GCS, minimal penetration of the cranial vault, absence of a mass-occupying lesion, and particularly in those patients with bone fragments on, or in close proximity, to dural venous sinuses. In these patients, we believed that the risks of surgical debridement outweighed the potential benefits.

Results

In our subset of high GCS patients treated with bedside washout and antibiotics, we had a very low rate of abscess formation and local wound infection. In this same group we did not have any significant problems with post-traumatic seizures.

Conclusions

Although more detailed analysis is required, our experience demonstrates that a more conservative approach to the treatment of civilian GSWH is associated with good outcomes. We are currently performing a retrospective analysis of patients presenting to our trauma center to compare the results of the conservative management approach with traditional surgical debridement.

DATA

Figure 1

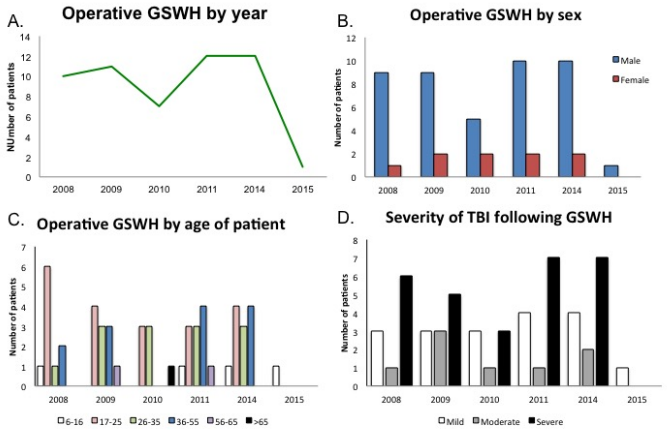

Figure 1: Operative GSWH cases at Ryder Trauma Center by year. **A.)** Total operative cases. **B.)** Operative cases by sex of the patient. **C.)** Analyzed by age of the patient. **D.)** Analyzed by severity of TBI (mild GCS 3-8; moderate GCS 9-12; severe GCS 13-15).

Table 1

	OR debridement	Bedside washout
Male (%)	11 (85%)	13 (93%)
Female (%)	2 (15%)	1 (7%)
Average age	31	35
Average GCS	9	12.4
Seizures (%)	2 (15%)	0
Avg # ICU days	18.6	2.4
Superficial infection	0	1
Meningitis	1	0
Intracranial abscess	1	0

Table 1: Characteristics of patients undergoing OR debridement vs. bedside wound washout. Of note, the one patient who developed meningitis had a CSF leak.

Figure 2

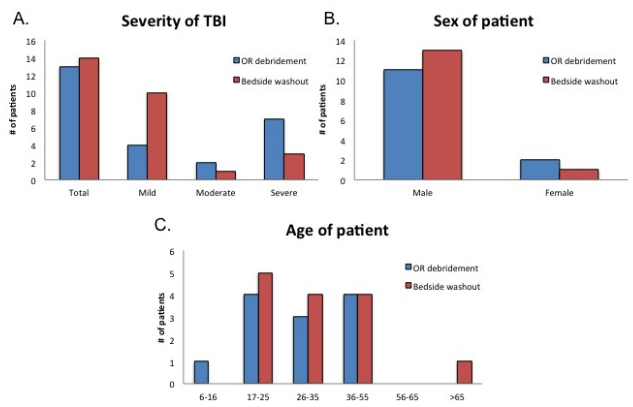

Figure 2: GSWH cases requiring either surgical intervention or bedside wound debridement. **A.)** Cases analyzed by severity of TBI. **B.)** Analyzed by sex of the patient. **C.)** Analyzed by age of the patient.

Future directions

These data suggest that bedside washout is a reasonable alternative to OR debridement in a subset of patients with GSW to the head. The bedside debridement has the advantage of avoiding general anesthesia with loss of the neurologic exam in an already head injured patient.

- Obtain more patient data with longer term follow up.
- Analyze for rates of late post-traumatic seizure and delayed infections. In our population, we saw deep infections in the OR group and not the bedside washout group. This may be due to selection bias. Additionally, the one case of meningitis was a later complication seen in a patient with an anterior skull base defect who developed a CSF leak.
- Ascertain which patients may benefit the most from bedside washout in comparison with OR debridement. Patients most suited for bedside washout are those without large mass-occupying lesions, patients with bone fragments near the dural venous sinuses, and likely patients with higher GCS.
- Identify risk factors for the development of infection in order to institute early aggressive antibiotic therapy.