

Minimally Invasive Evacuation of Chronic Subdural Hematoma in the ICU as a Safe and Cost-Effective Alternative to Burr Hole Surgery

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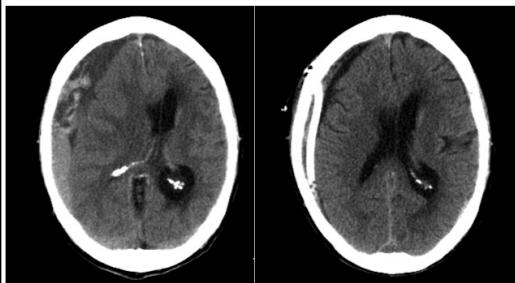
Introduction

In symptomatic chronic subdural hematomas (cSDH) necessitating evacuation, drainage via a minimally invasive twist drill craniostomy performed at bedside in the ICU has been proposed as an alternative to standard burr hole evacuation performed in OR.

Methods

We retrospectively analyzed the single-institution, single-surgeon experience of 49 consecutive cSDH evacuation procedures. Patients with symptomatic cSDH were assigned to either twist drill craniostomy (at bedside in ICU, under sedation) or burr hole (in OR) by the attending neurosurgeon. All patients had a subdural drain left in place at the time of procedure.

Pre- and post-bedside drainage



Method of twist drill craniostomy



Baseline characteristics of groups

	Type of procedure	
	OR (Burr holes)	Bedside (Twist drill)
# of Cases	31	18
Age, mean (std)	81.9 (15.0)	79.8 (11.3)
Sex (M:F)	21:10	10:8
Laterality		
Right-sided procedure	14	8
Left-sided "	10	8
Bilateral "	7	2

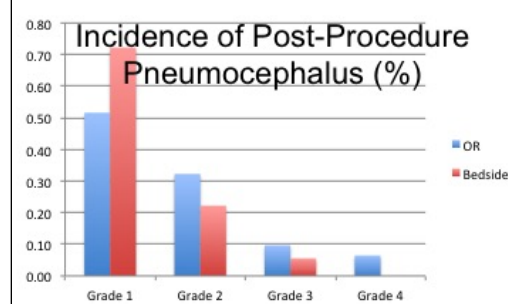
Results

43 patients underwent 18 bedside and 31 OR procedures. At baseline, the bedside and OR groups were similar in age (79.8 vs. 81.9 years), gender, and radiographic characteristics of cSDH composition, thickness, and mass effect. Complications were of similar incidence, with need for 2 repeat procedures in the bedside group and 3 reoperations in the OR group due to reaccumulation. All other patients had a satisfactory clinical-radiographic result. The incidence of postoperative pneumocephalus (Grade 2 or higher) was lower after bedside procedures (28% vs. 48%, $p=0.03$). No patients initially treated at bedside required conversion to surgery, although 2 patients treated with burr holes in the OR later underwent bedside drainage. No mortalities. Postoperative recovery was enhanced in the bedside group, with a trend to more patients discharged to home (75% vs. 55%, $p=0.06$) as well as trends toward shorter mean length of stay in ICU (3.2 vs. 4.1 days) and hospital (6.8 vs. 8.5 days).

Patient LOS and disposition

	Location of procedure		p value
	OR	Bedside (ICU)	
Discharged to home (%)	55%	75%	0.06
Post-procedure length of stay:			
in ICU, median [IQR]	3 [2.0-4.0]	3 [2.25-4]	>0.2
in hospital, median [IQR]	5 [4.0-10.0]	6.5 [4.25-7.75]	>0.2

Radiographic outcomes



Grade 1	Small: subcentimeter foci
Grade 2	Medium: air collection <20% SDH volume
Grade 3	Large: >20% and/or mass effect
Grade 4	Tension: significant mass effect requiring intervention

	OR	Bedside	p
Pneumocephalus (>Grade 2)	48%	28%	0.03
Reduction in MLS, mm	1.9	2.6	>0.2

Complications by procedure type

	OR burr holes (n = 31)	Bedside twist-drill (n = 18)
Mortality	0	0
Re-operation of SDH (within mean follow-up 2 years)	3	2
Re-admission for other reason (30 days)	0	1 (seizures)
Infection	0	1 (GPC, previous Rickham reservoir / immunocompromised)
IPH/SAH	1	0

Conclusions

Minimally invasive bedside drainage of cSDH in the ICU represents a viable alternative to standard burr hole surgery. Whereas the bedside and OR groups had equivalent clinical-radiographic outcomes, elderly patients undergoing bedside drainage showed evidence of better postoperative recovery and reduced healthcare resource utilization.

Selected References

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