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## **Spreading Depolarization After Chronic Subdural Hematoma Evacuation: Associated Clinical Risk Factors and Influence on Clinical Outcome**

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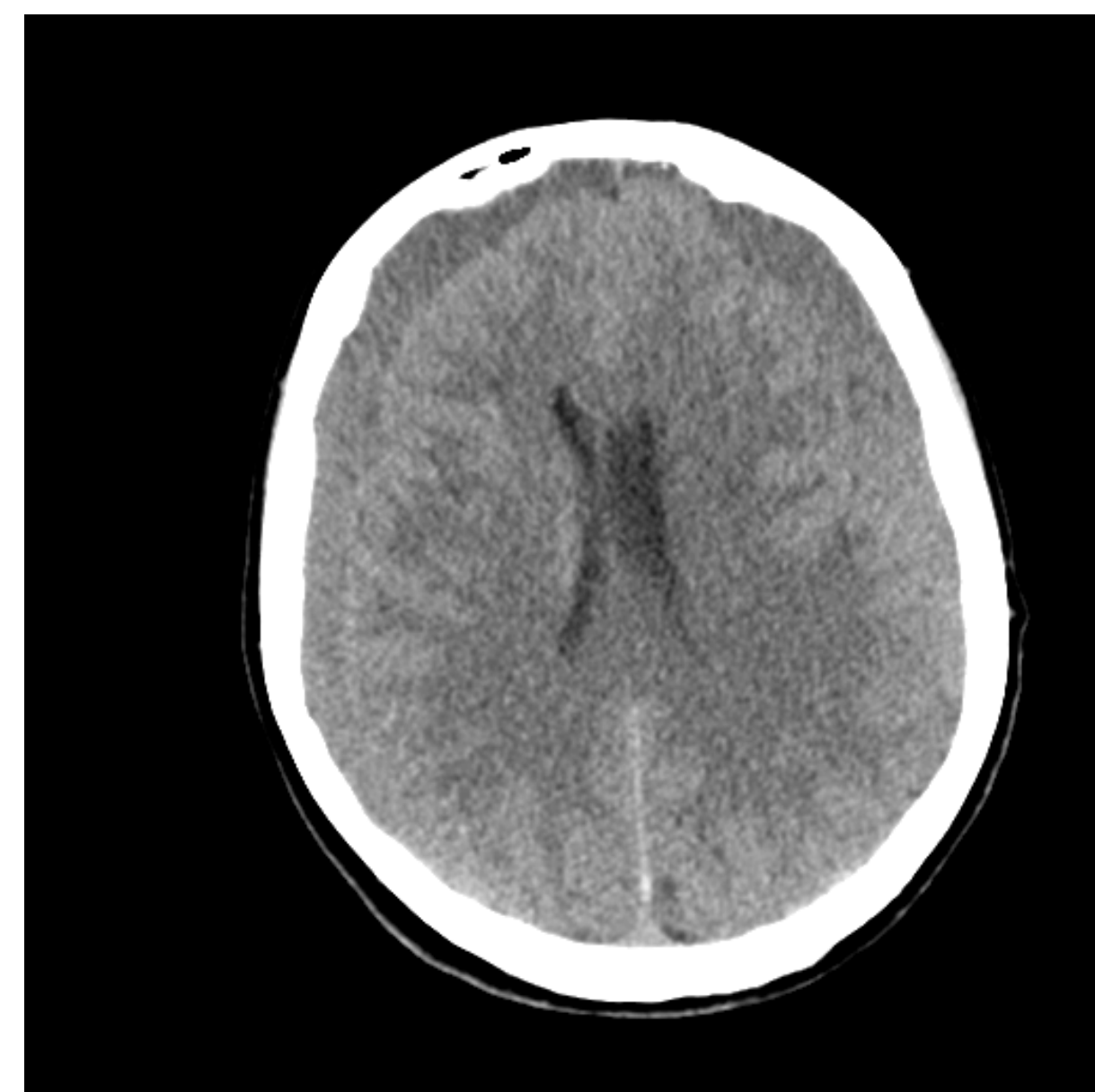
# Spreading Depolarization After Chronic Subdural Hematoma Evacuation: Predictive Factors and Influence on Clinical Outcome

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## Background and Objectives

- Chronic subdural hematoma (cSDH) is predicted to be the most common neurosurgical pathology by 2030.
- Recovery after evacuation is complicated by fluctuating neurological deficits in 25% of patients.
- Spreading depolarization (SD) may be responsible for these deficits.
- Here, we identify candidate risk factors for probable SD and assess the influence of probable SD on outcome.



CT scan of a patient with bilateral cSDH with 3mm midline shift. LOS was 5 days.

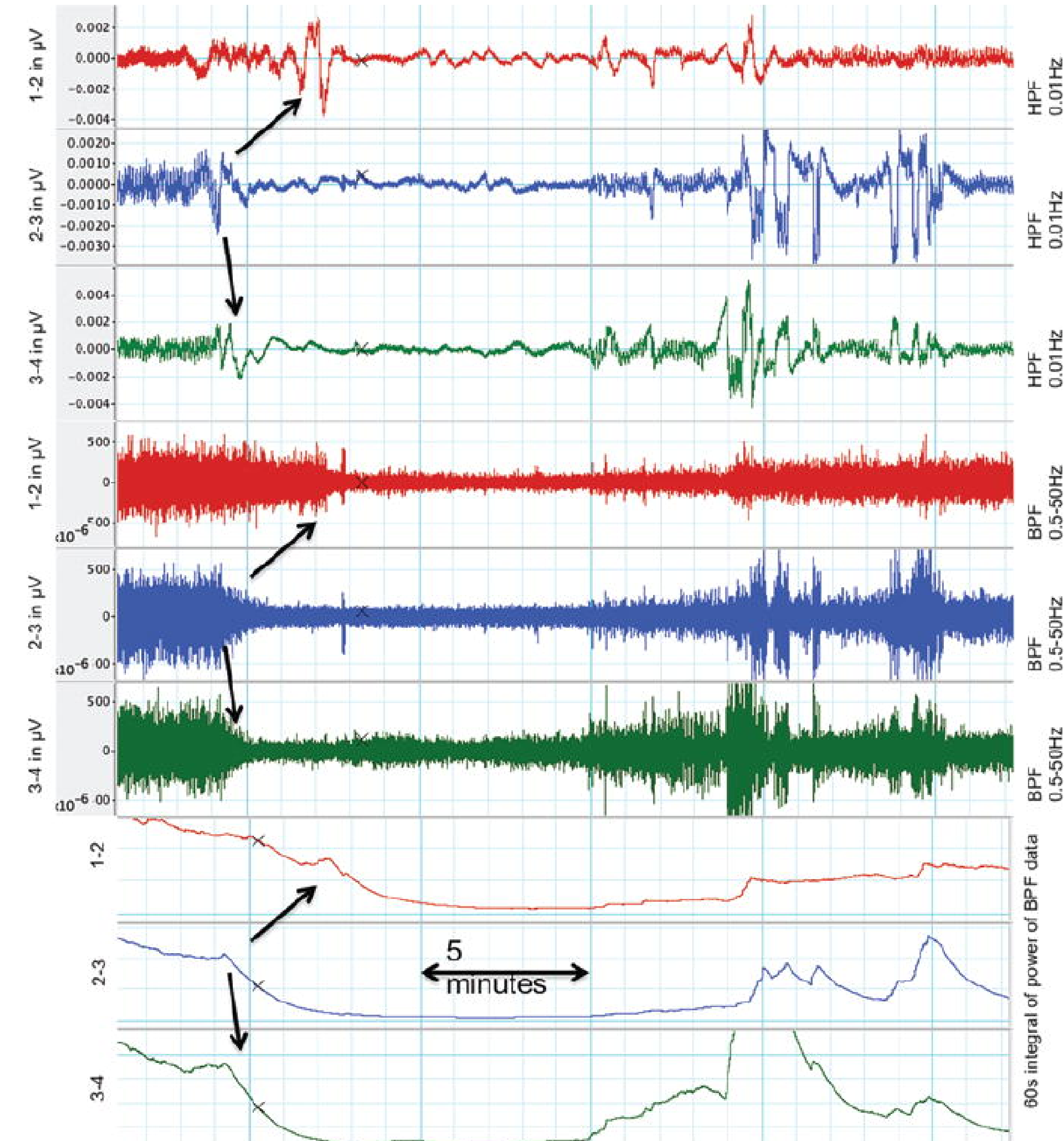


CT scan of a patient with unilateral cSDH without midline shift. LOS was 25 days. ECoG confirmed SD.

## Methods

- Cohort 1** (n=40): patients with electrocortigraphic (ECoG) monitoring. 15% (n=6) had definitive SD.
- Cohort 2** (n=345): subjects who we suspected had probable SD determined by having post-operative neurological exam changes not otherwise explained. 23% had suspected SD.
- Indications for EEG included suspected seizure (19.8%), encephalopathy (52.8%), aphasia (17%), motor deficit (7.5%), and cranial nerve deficit (2.8%). EEG was negative for seizure.
- We performed univariable logistic regression to identify factors associated with poor outcome as measured by Glasgow Outcome Scale (GOS) at first clinic visit and hospital length of stay (LOS).

Table 1: ECoG monitoring recording of SD. Note suppression of ECoG recording (arrows) with slow recovery over 15 minutes.



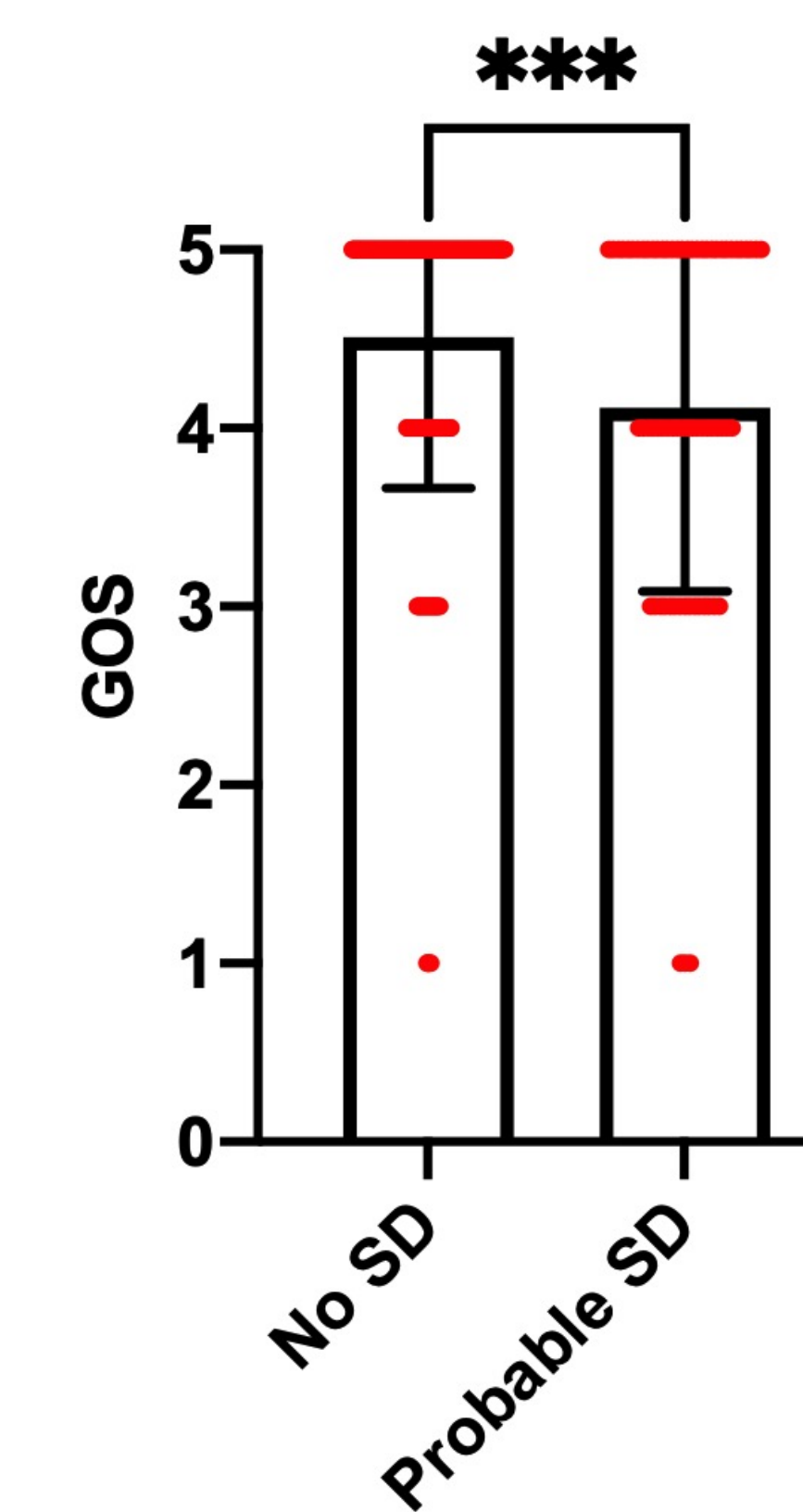
Carlson, A. P., William Shuttleworth, C., Mead, B., Burbaw, B., Krasberg, M., & Yonas, H. (2017). Cortical spreading depression occurs during elective neurosurgical procedures. *Journal of Neurosurgery JNS*, 126(1), 266-273. Retrieved Mar 26, 2021, from <https://thejns.org/view/journals/j-neurosurg/126/1/article-p266.xml>

Table 2: Probable SD is independently predictive of longer hospital stay and worse clinical outcome.

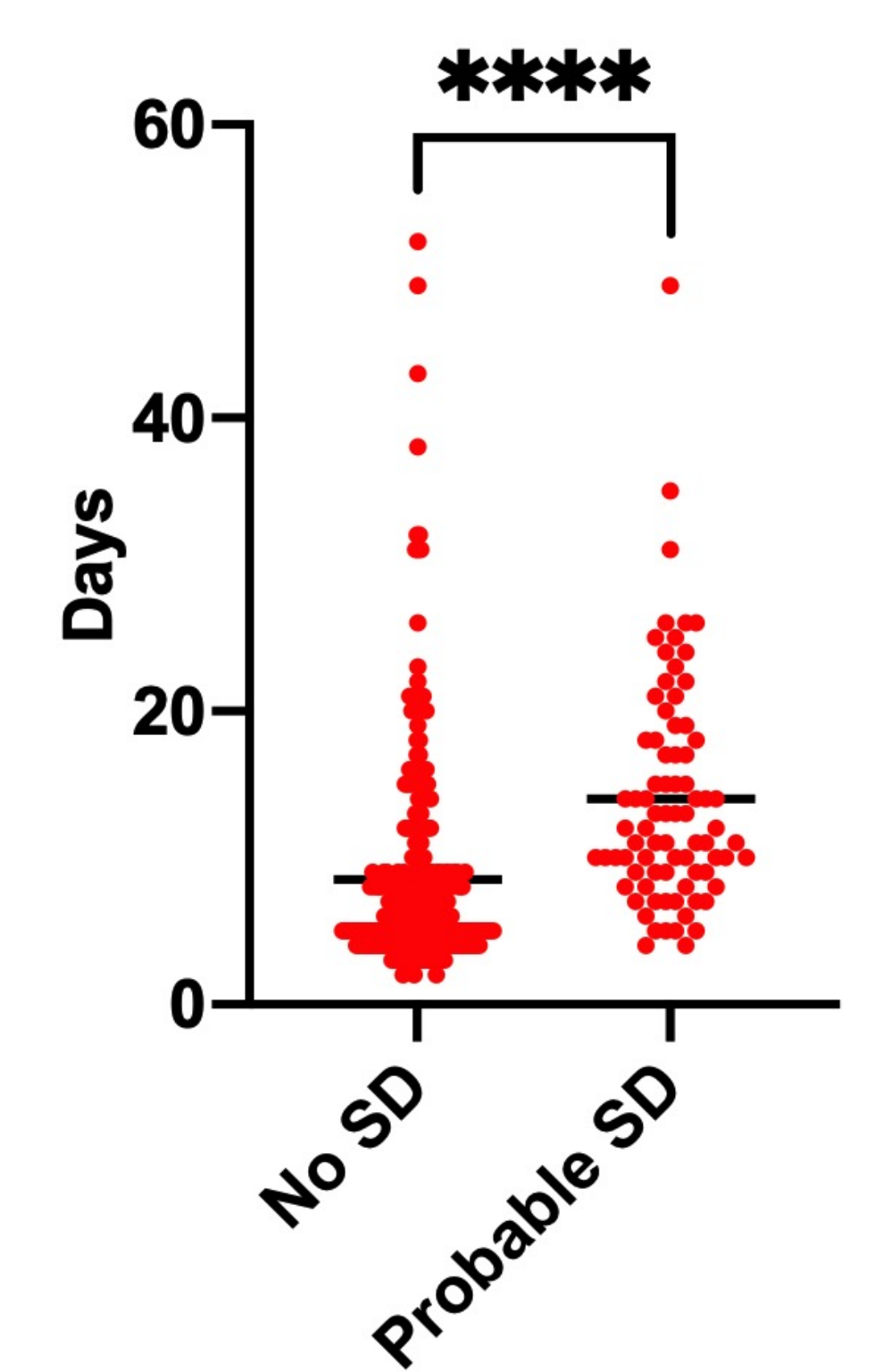
Glasgow Outcome Scale at First Follow-up Clinic Visit (GOS)					
Covariates	Univariable Analysis		Multivariable Analysis		P value
	OR	95% CI	OR	95% CI	
Probable SD	2.359	1.415-3.933	4	1.022-3.146	0.04
Admission GCS	4.301	2.731-6.774	4	2.487-6.430	<0.0001
Liver Disease	2.968	1.178-7.478	4	1.213-10.377	0.02
Seizure on Admission	2.991	1.016-8.804	3	1.007-11.823	0.05
Hospital Length of Stay					
Covariates	Univariable Analysis		Multivariable Analysis		p value
	OR	95% CI	OR	95% CI	
Probable SD	8.164	4.355-15.306	8	4.062-15.567	<0.0001
Admission GCS	4.301	4.076-2.595	4	2.307-6.163	<0.0001

## Results

### GOS at first clinic visit



### Length of stay



- 80/345 (23%) of subjects in cohort 2 had probable SD.
- Admission risk factors included hypertension, lower GCS, low SDH density and volume.
- Patients with known and suspected SD had longer lengths of stay and worse outcomes.

## Discussion and Conclusions

- Patients with suspected SD have worse clinical outcomes **independent** of admission characteristics and severity of cSDH.
- Further work focused on identifying this high-risk population and developing targeted therapies is crucial.

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