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Outcomes of patients with traumatic brain injury after stress ulcer prophylaxis: a retrospective multicenter study

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ABSTRACT

Background Stress ulcers in patients with traumatic brain injury (TBI) and spinal cord injury (SCI) present significant morbidity and mortality risks. Despite the low reported stress ulcer rates, stress ulcer prophylaxis (SUP) is widely administered in neurocritical care. It was hypothesized that universal SUP administration may not be associated with reduced rates of complications across all neurocritical care patients.

Methods This retrospective study encompassed neurocritical care patients aged ≥18 with moderate or severe TBI or SCI, admitted to the intensive care unit (ICU) between October 2020 and September 2021, across six level I trauma centers. Exclusions included patients with an ICU stay <2 days, prior SUP medication use, and pre-existing SUP diagnoses. The primary exposure was SUP, with the primary outcome being clinically significant gastrointestinal bleeds (CSGIBs). Secondary outcomes included pneumonia and in-hospital mortality. Patients were stratified by admission Glasgow Coma Scale (GCS) groups.

Results Among 407 patients, 83% received SUP, primarily H2 receptor antagonists (88%) and proton pump inhibitors (12%). Patients on SUP were significantly younger, had lower admission GCS scores, higher Injury Severity Scores, longer ICU stays, and higher rates of mechanical ventilation than non-SUP patients. Overall, CSGIBs were rare (1%) and not significantly different between the SUP and non-SUP groups (p=0.06). However, CSGIBs exclusively occurred in patients with GCS scores of 3–8, and SUP was associated with a significantly lower rate of CSGIBs in this subgroup (p=0.03). SUP was also linked to significantly higher pneumonia rates in both GCS 3–8 and GCS 9–12 patients.

Conclusions This study highlights the low incidence of CSGIBs in neurocritical trauma patients and suggests potential benefits of SUP, particularly for those with severe neurological impairment. Nevertheless, the increased risk of pneumonia associated with SUP in these patients warrants caution. Further research is crucial to refine SUP guidelines for neurocritical care patients and inform optimal strategies.

Level of evidence Level III, retrospective.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Although current guidelines advocate universal stress ulcer prophylaxis (SUP) for neurocritical trauma patients, recent studies have highlighted concerns about side effects and improper administration.

WHAT THIS STUDY ADDS

⇒ The study identified a low incidence of clinically significant gastrointestinal bleeds (CSGIBs), which were exclusive to patients with severe traumatic brain injuries. Within this subgroup, SUP was associated with a significant reduction in CSGIBs, suggesting a potential benefit for patients with higher severity head injury.

⇒ However, the study also revealed higher rates of pneumonia, especially among patients with severe and moderate head injuries who received SUP, highlighting the need for a more personalized approach to SUP decision-making.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The study suggests that a one-size-fits-all approach to SUP in neurocritical care settings may not be optimal. Instead, personalized SUP practices based on individual patient characteristics, including injury severity, should be considered to optimize both safety and efficacy.

⇒ These findings may prompt a reconsideration of current guidelines recommending universal SUP for neurocritical trauma patients and encourage a more nuanced approach to SUP administration in clinical practice.

BACKGROUND

Patients with traumatic brain injuries (TBI) and other neurological trauma are at heightened risk for developing gastric stress ulcers during their hospital stay because of increased intracranial pressure and overstimulation of the vagus nerve, which can cause excess production of gastric acid as well as general hypoperfusion of the gut due to the stress of critical illness.[1–4] Stress ulcers are considered a severe complication among critically ill patients and are associated with increased risk for in-hospital complications, such as clinically significant gastrointestinal bleeds (CSGIBs), pneumonia, and mortality.[1 2 4–6] To prevent stress ulcers from developing, pharmacologic stress ulcer prophylaxis (SUP) is commonly administered to critically ill and high-risk patients, initiated at either hospital arrival or on admittance to the intensive care unit (ICU).[2 5 7–9] Commonly used SUP options include histamine 2 blockers, also called H2 receptor

antagonists or H2RAs, which increase gastric pH and are the most commonly used prophylaxis methods[10 11]; proton pump inhibitors (PPIs), which inhibit acid secretion[12]; and antacids.[4 5] However, there are conflicting reports on selecting the appropriate patient population to receive SUP, as well as which prophylaxis method is preferable in both reducing the risk of stress ulcers and minimizing adverse events. Current guidelines for administration of SUP from the Eastern Association for the Surgery of Trauma include TBI, multitrauma, and ICU patients with an Injury Severity Score (ISS) >15.[13] A meta-analysis of 63 randomized controlled trials reported that H2RAs decrease the incidence of overt and CSGIB better than antacids in critically ill patients, yet patients receiving H2RAs had a higher incidence of pneumonia, as well as higher mortality, compared with sucralfate.[14] The PEPTIC trial compared PPIs and H2RAs in critically ill patients, and there was no difference in all-cause mortality, but possibly lower rates of CSGIBs with PPIs.[15] In separate studies, patients on PPIs had higher rates of in-hospital pneumonia than those on H2RAs and antacids.[5 7] A review published in 2020 suggested that PPIs may lead to increased risk of death, over that posed by ulcer-related gastrointestinal (GI) bleeds, among the subgroup of patients with high-severity trauma or illness.[16]

Because of the potential side effects of SUP, patients at high risk of ulcers should be potentially targeted for prophylaxis rather than implementing a universal order for prophylaxis on all critically ill patients.[4 8 9] Recent studies have begun to examine this issue, aiming to parse the ICU population into those in whom prophylaxis administration is likely to be most beneficial and those in whom prophylaxis may either be unnecessary or actively harmful.[17–19] However, these studies have found deviations from internal guidelines in ICU settings, with prolonged and inappropriate SUP prescriptions.[18 19] Additionally, a lack of awareness among ICU clinicians regarding initiation, choice, and duration of prophylaxis, as well as potential side effects, has been observed.[17]

Considering these issues and anecdotal evidence suggesting a shift toward SUP specifically for severe TBIs, there is a growing need to reassess current guidelines recommending universal SUP for neurocritical trauma patients. Therefore, the aims of this study were fourfold: (1) to describe the current SUP practices, (2) to identify the rate of CSGIBs, (3) to identify complications associated with SUP, and (4) to identify any clinical factors contributing to the rate of CSGIBs in neurocritical trauma patients. It was hypothesized that universal SUP administration may not be associated with reduced rates of complications across all neurocritical trauma patients.

METHODS

This was a retrospective observational study of neurocritical adult patients (≥18 years) who were admitted with a moderate or severe TBI or spinal cord injury (SCI) to the ICUs of six level I trauma centers. The study period was from October 1, 2020 to September 30, 2021. All included patients had a Glasgow Coma Scale (GCS) score <13. Patients with a TBI diagnosis were identified using the ICD-10 (International Classification of Diseases-Tenth Revision) codes: S02.0, S02.1, S02.9, S06.0–S06.6, S06.8, S06.9, S06.A, and S07.1. Patients with SCI were identified using the following codes: S14, S24, S32. Exclusions included patients with pre-existing stress ulcers, patients receiving stress ulcer medications prior to arrival, and patients with an ICU length of stay (LOS) less than 2 days. This study was approved by institutional review boards at each of the participating centers.

Baseline demographics including age, sex, race, admitting diagnosis, admission GCS and ISS were collected from the trauma registry. Injury characteristics, in-hospital medications and treatments, laboratory results, and in-hospital procedures were collected through electronic health record (EHR) review.

The primary exposure variable was administration of SUP. H2RAs are used as prophylactic treatment, whether administered once or twice daily. PPIs are typically prescribed as once-daily prophylaxis. Patients in the SUP group received prophylaxis as their first line of medication, while patients in the non-SUP group received no prophylaxis. The primary outcome was the rate of CSGIBs collected through EHR review. A CSGIB was defined as overt GI bleeding confirmed by upper GI endoscopy, and at least one of the following within 24 hours of bleeding event: (1) systolic blood pressure decrease of more than 20 mm Hg or requirement for a vasopressor, (2) decrease in hemoglobin of at least 2 g/L, or (3) transfusion of two or more units of packed red blood cells. This definition is consistent with previous literature published by Young and colleagues.[15] Secondary outcomes included in-hospital mortality, myocardial infarction, pneumonia, and *Clostridium difficile* infections. All-cause pneumonia was confirmed by any positive laboratory cultures and chest radiographs and included ventilator-associated pneumonia (VAP) (American College of Surgeons National Trauma Data Standard 2023 definition[20]) and non-VAP; *C. difficile* was identified through positive stool cultures; myocardial infarction was identified by cardiology notes; and in-hospital mortality was defined as death within the index admission. Additional secondary outcomes examined other clinical factors associated with stress ulcers in this patient population including enteral feeding, presence of *Helicobacter pylori* bacteria, and presence of anticoagulation or antithrombotic medications prior to admission. Enteral feeding was retrieved from the EHR as either an order for an adult diet or tube feeding administration on day 1 of admission; *H. pylori* was identified as a positive breath, stool, or blood test results; and anticoagulant or antiplatelet use prior to admission was identified via EHR review.

Patient characteristics and outcomes were examined by proportion of patients receiving SUP administration. SUP practices were also described by the median time to initiation in hours, and the median duration of the prophylaxis course in days. X^2 tests and Fisher's exact tests were used for categorical variables, while continuous data were analyzed using Wilcoxon-Mann-Whitney U tests, one-way analysis of variances, and Kruskal-Wallis tests, as necessary. A stratified analysis was conducted by admission GCS to examine variations in the efficacy of SUP by TBI severity. A significance level of $\alpha<0.05$ and SAS V.9.4 (Cary, NC) were used to conduct all statistical analyses.

RESULTS

Four hundred and ninety-eight patients were screened for inclusion. Of these, 407 met the inclusion criteria and were included in the analysis (figure 1). Patients were excluded for an ICU LOS less than 2 days and receiving prophylaxis medications prior to arrival. Overall, patients included in this study were male (78%) and were a median age of 46 (31–64) years. The most common causes of injury were falls (33%) and motor vehicle crashes (MVCs) (28%). The median ISS was 25 (17–30), and patients spent 7 (3–13) days in the ICU. Most patients (83%) received SUP and of those, H2RAs were the most common (88%), followed by PPIs (12%).

Baseline characteristics by SUP administration practices are described in table 1. Significantly more patients on SUP were

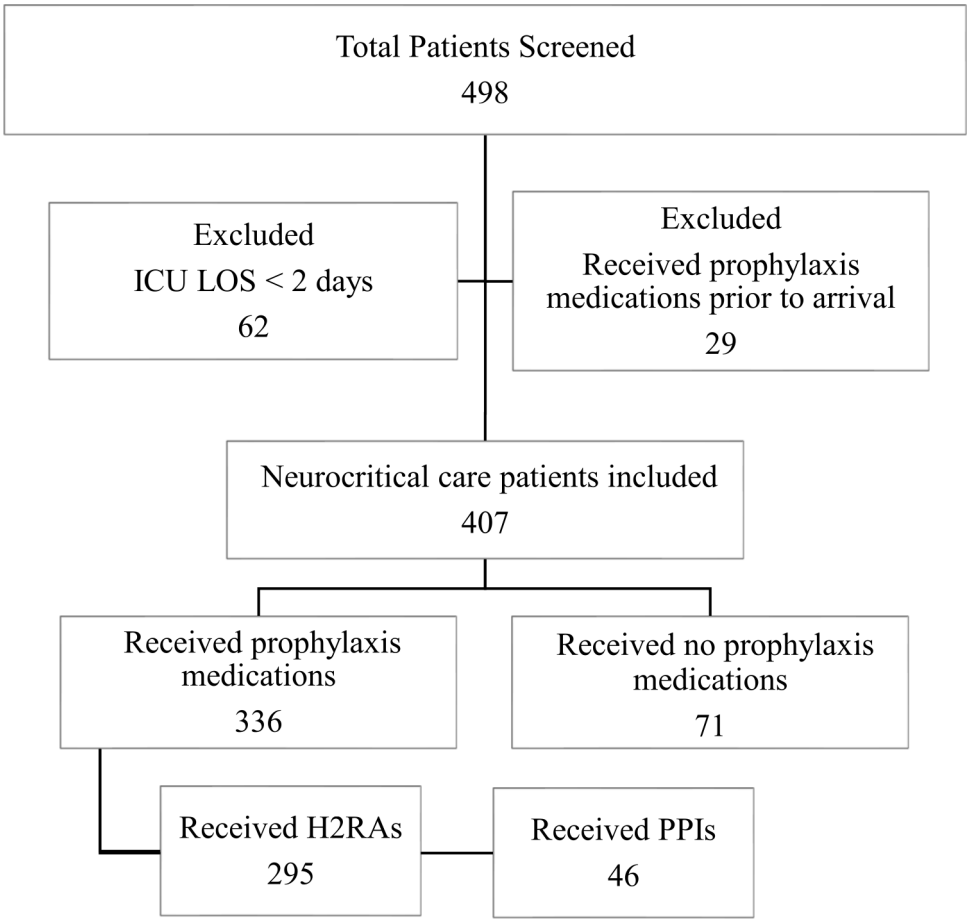

Figure 1 Flow chart of the eligibility for study inclusion. H2RA, histamine type 2 receptor antagonist; ICU, intensive care unit; LOS, length of stay; PPI, protein pump inhibitor.

in the age group of 18–43 years (48% vs. 37%, p=0.02), had a higher rate of MVCs (31% vs. 13%, p=0.007), had a higher median ISS (26 (17–33) vs. 22 (14–26), p<0.002), a lower admission GCS score (3 (3–8) vs. 7 (3–11), p=0.001), and more were admitted with both a TBI and an SCI (37% vs. 15%, p=0.003), compared with the non-SUP patients. Moreover, attributed to the younger age of the SUP patients, it is unsurprising that there were both fewer patients receiving SUP who had an advance directive (3% vs. 14%, p=0.001), and fewer who had a functionally dependent health status (7% vs. 20%, p=0.006) compared with those not receiving SUP. Additionally, patients who received SUP tended to have both a longer hospital (14 (6–24) vs. 4 (2–11), p<0.001) and ICU LOS (8 (4–14) vs. 3 (2–6), p<0.001), respectively, higher rates of mechanical ventilation (89% vs. 63%, p<0.001), and more patients administered enteral feeding (66% vs. 31%, p<0.001), compared with those not receiving SUP.

The median time to SUP administration was 8 (5–14) hours from hospital arrival, with a median treatment duration of 3.3 (0.0–9.5) days. Clinical outcomes by SUP practices are described in table 2. CSGIBs were rare, occurring in only 0.9% of patients receiving SUP and 4% of those not receiving SUP. Although the difference in CSGIB rates by SUP group trended toward significance (p=0.06), it did not reach statistical significance. Furthermore, the SUP group exhibited higher rates of all-cause pneumonia (21% vs. 1%, p<0.001) and VAP (10% vs. 0%, p=0.006) compared with the non-SUP group. No significant differences were observed in *C. difficile* infection or in-hospital mortality between groups, and no cases of *H. pylori* were identified.

Overall, patients with a CSGIB had a median (IQR) hospitalization duration of 23 (11–27) days, spent an average of 10 days (5–19) in the ICU, had an ISS of 23.5 (17–34), and 50% were admitted for a TBI. Table 3 provides a summary of any clinical differences between patients with and without CSGIBs. A significantly higher proportion of patients with CSGIBs fell within the age bracket of 44–65 years (83% vs. 26%, p=0.01) compared with those without CSGIBs. There were no other statistically significant differences associated with CSGIBs.

Importantly, CSGIBs were exclusively observed in patients with an admission GCS score between 3 and 8, and it is worth noting that patients with CSGIBs did not develop pneumonia, *C. difficile* infections, or experience any in-hospital fatalities. Tables 4 and 5 compare outcomes by SUP administration among GCS 3–8 and GCS 9–12 patients, respectively. In the GCS 3–8 subgroup, SUP corresponded to fewer CSGIB cases (1% vs. 7%, p=0.03, table 4), more all-cause pneumonia cases (23% vs. 2%, p=0.002), and more VAP (10% vs. 0%, p=0.03). In the GCS 9–12 subgroup, the SUP group exhibited significantly higher rates of all-cause pneumonia (15% vs. 0%, p=0.03, table 5) and higher rates of VAP (9% vs. 0%, p=0.09), though without statistical significance, compared with the non-SUP patients. A summarized overview of clinical differences between patients with and without pneumonia is provided in online supplemental table 1.

Table 1 Overall patient characteristics by stress ulcer prophylaxis administration

Characteristics n (%)	SUP 336 (83%)	No SUP 71 (17%)	P value
Age, median (IQR) years	45 (31–63)	53 (32–75)	**0.02**
18–43	166 (48%)	26 (37%)	**0.02**
44–65	104 (30%)	18 (25%)	
>65	79 (23%)	27 (38%)	
Sex			0.12
Male	271 (78%)	49 (69%)	
Female	78 (22%)	22 (31%)	
Cause of injury (3 unknown)			**0.007**
Fall	109 (32%)	35 (49%)	
MVC	107 (31%)	9 (13%)	
GSW	15 (4%)	5 (7%)	
MCC	42 (12%)	6 (8%)	
Other	73 (21%)	16 (23%)	
Admission diagnosis			**0.003**
TBI only	200 (60%)	57 (80%)	
SCI only	13 (4%)	3 (4%)	
Both	123 (37%)	11 (15%)	
ISS, median (IQR) (missing 2)	26 (17–33)	22 (14–26)	**0.002**
1–9	17 (5%)	8 (11%)	**0.01**
10–15	28 (8%)	11 (15%)	
≥16	302 (87%)	52 (73%)	
GCS, median (IQR)	3 (3–8)	7 (3–11)	**0.001**
3–8	281 (81%)	43 (61%)	**0.003**
9–12	68 (19%)	28 (39%)	
Antithrombotic use PTA (missing 8)			
Anticoagulants	26 (8%)	2 (3%)	0.20
Antiplatelets	16 (5%)	6 (9%)	0.25
Comorbidities			
Advance directive	12 (3%)	10 (14%)	**0.001**
Anticoagulant therapy	36 (10%)	4 (6%)	0.22
Functionally dependent health	24 (7%)	14 (20%)	**0.006**
Alcohol use disorder	69 (20%)	8 (11%)	0.09
Diabetes	30 (8%)	6 (9%)	0.68
Current smoker	47 (13%)	10 (14%)	0.89
Hypertension	80 (23%)	16 (23%)	0.94
LOS, median (IQR) days	14 (6–24)	4 (2–11)	**<0.001**
ICU LOS, median (IQR) days	8 (4–14)	3 (2–6)	**<0.001**
Mechanical ventilation	310 (89%)	45 (63%)	**<0.001**
Vent days	6 (3–12)	2 (2–6)	**<0.001**
Enteral feeding	230 (66%)	22 (31%)	**<0.001**

Bold p-values indicate statistical significance at p<0.05.
GCS, Glasgow Coma Scale; GSW, gunshot wound; ICU, intensive care unit; ISS, Injury Severity Score; LOS, length of stay; MCC, motorcycle crash; MVC, motor vehicle crash; PTA, prior to arrival; SCI, spinal cord injury; SUP, stress ulcer prophylaxis; TBI, traumatic brain injury.

DISCUSSION

This retrospective multicenter study focused on prophylaxis practices and outcomes in neurocritical trauma patients, revealing a relatively high prevalence of SUP prescription (83%). Notably, this population, often under-represented in literature, demonstrated a higher SUP utilization rate compared with previous studies, but a lower rate than others (75–95%).[11 16 19] H2RAs were predominantly prescribed (88%) over PPIs (12%), potentially due to cost-effectiveness and the associated lower risk of infections, aligning with findings reported in the literature.[5 21] Additionally, this study found a low incidence of CSGIBs (1%) in this high-risk patient population, which is consistent with the rate reported by Palm and colleagues of 0.7% in patients with TBI with enteral feeding and lower than the rate reported previously for general critically ill patients.[22 23] Higher rates of CSGIB found in other studies are likely due to variable definitions of CSGIB. In this study, the definition for a CSGIB was a positive endoscopy finding of a bleeding ulcer, in addition to at

Table 2 Clinical outcomes by stress ulcer prophylaxis administration

Outcomes	SUP 336 (83%)	No SUP 71 (17%)	P value
CSGIBs	3 (0.9%)	3 (4%)	0.06
All-cause pneumonia	71 (21%)	1 (1%)	**<0.001**
Ventilator-associated pneumonia	33 (10%)	0 (0%)	**0.006**
Clostridium difficile	7 (2%)	0 (0%)	0.61
Helicobacter pylori	0 (0%)	0 (0%)	
In-hospital mortality	58 (17%)	16 (23%)	0.24

Bold p-values indicate statistical significance at p<0.05.
CSGIBs, clinically significant gastrointestinal bleeds; SUP, stress ulcer prophylaxis.

Table 3 Overall patient characteristics by CSGIB diagnosis

Characteristics n (%)	CSGIB 6 (1%)	No CSGIB 401 (99%)	P value
Age, years			**0.01**
18–43	1 (17%)	194 (48%)	
44–65	5 (83%)	106 (26%)	
>65	0 (0%)	101 (25%)	
Sex			>0.99
Male	5 (83%)	315 (76%)	
Female	1 (17%)	99 (24%)	
Admitting diagnosis			0.29
TBI only	3 (50%)	254 (63%)	
SCI only	1 (17%)	15 (4%)	
Both	2 (33%)	132 (33%)	
ISS, median (IQR) (missing 2)	23.5 (17–34)	26 (17–30)	0.69
GCS, median (IQR)	3 (3–7)	3 (3–8)	0.35
3–8	6 (100%)	318 (77%)	
9–12	0 (0%)	96 (23%)	
Hospital LOS, median (IQR) days	23 (11–27)	12 (5–22)	0.11
ICU LOS, median (IQR) days	10 (5–19)	7 (3–13)	0.24
Received SUP	3 (50%)	333 (83%)	0.07
Mechanical ventilation	5 (83%)	339 (85%)	>0.99
Vent days	4 (3–13)	5 (2–12)	0.91
Enteral feeding	5 (83%)	226 (56%)	0.24
Clostridium difficile	0 (0%)	7 (2%)	>0.99
All-cause pneumonia	0 (0%)	72 (18%)	0.60
In-hospital mortality	0 (0%)	72 (18%)	0.60

Bold p-values indicate statistical significance at p<0.05.
CSGIB, clinically significant gastrointestinal bleed; GCS, Glasgow Coma Scale; ICU, intensive care unit; ISS, Injury Severity Score; LOS, length of stay; SCI, spinal cord injury; SUP, stress ulcer prophylaxis; TBI, traumatic brain injury.

Table 4 Clinical outcomes of stress ulcer prophylaxis, stratified by admission GCS 3–8

Outcomes	SUP 270 (86%)	No SUP 43 (14%)	P value
CSGIBs	3 (1%)	3 (7%)	**0.03**
All-cause pneumonia	61 (23%)	1 (2%)	**0.002**
Ventilator-associated pneumonia	27 (10%)	0 (0%)	**0.03**
Clostridium difficile	6 (2%)	0 (0%)	>0.99
Helicobacter pylori	0 (0%)	0 (0%)	
In-hospital mortality	51 (18%)	13 (30%)	0.07

Bold p-values indicate statistical significance at p<0.05.
CSGIBs, clinically significant gastrointestinal bleeds; GCS, Glasgow Coma Scale; SUP, stress ulcer prophylaxis.

least one other clinical criterion within 24 hours of the bleed.[15] While this strict definition likely led to lower reported rates of CSGIBs, its application was most appropriate for this trauma patient population.

While this study exhibited a low incidence of CSGIBs, these events were exclusive to patients with severe TBIs and SCIs. Moreover, fewer cases of CSGIBs were observed among patients who received SUP within this subgroup. This is unsurprising, given that neurocritical patients face a heightened vulnerability to CSGIBs due to increased acid secretion triggered by vagal overstimulation, impaired mucosal blood flow, and increased intracranial pressure.[23 24] These factors, when combined with mechanical ventilation, hypotension, and coagulopathy, heighten the likelihood of upper GI bleeding in neurocritical patients.[23 24] Several older studies have shown that severe TBI and GCS scores <9 are associated with hypersecretion of acid and high rates of CSGIBs.[25–28] Despite the link between neurological status and the risk of GI bleeds, there is a paucity of recent studies reporting on the development of CSGIBs by GCS severity in trauma patients. In line with these findings, Li and colleagues exclusively reported GI bleeds in patients with TBI with a GCS score ≤8,[29] while a systematic review by Liu *et al*, encompassing eight trials and 829 neurocritical care patients, noted a mean GCS score range of 5–9.8 but was not specific to trauma patients.[23]

Given the low incidence of CSGIBs observed in this study, SUP benefits may be questionable, especially among severely injured patients. These results support prior research indicating a higher incidence of pneumonia in patients receiving prophylaxis,[30] consistent with this study's observations. Considering that almost all pneumonia cases occurred in mechanically ventilated patients receiving prophylaxis, it is difficult to solely attribute pneumonia development to prophylaxis. Determining associations with pneumonia across studies is also challenging due to discrepancies in pneumonia definitions, contributing to result heterogeneity. A comprehensive meta-analysis by Wang *et al* revealed an increased pneumonia risk with both H2RAs and PPIs in critically ill adults,[30] while other trials and reviews found no significant differences in pneumonia rates by prophylaxis type.[23 31] Nevertheless, this underscores the need for cautious administration of SUP in critically ill patients. Differences in other complications by prophylaxis treatment were not significantly different between groups. Additionally, it is important to note that no deaths or other complications were observed among patients with CSGIBs. While previous studies on CSGIB mortality risk have produced conflicting results, with some suggesting increased mortality rates from bleeds,[23 32 33] others, including Harhay *et al*, suggest that the majority of upper GI bleeds in this context are non-fatal and do not significantly impact mortality, but that caution should be taken when administering SUP in patients with high illness severity.[16 22 30] These findings underscore the significance of a balanced approach when making prophylaxis decisions in clinical practice.

This study had several limitations. First, the retrospective nature of the study limits its generalizability to trauma centers with different patient populations. Nevertheless, the inclusion of six level I trauma centers balances this limitation. Second, with the strict definition of CSGIB used in this study it is possible that patients with lower grade GI bleeds were missed. Regardless, endoscopy remains the gold standard for diagnosing stress gastropathy-related GI bleeding in critical illness. Third, we were unable to confirm the specific qualifiers for the NTDS definition of VAP and we did not collect if the reason for the pneumonia was early aspiration. Fourth, there was no differentiation between intravenous or oral route of administration for SUP. Fifth, the risk of skipped doses was not assessed. Lastly, due to limitations with data collection, enteral feeding in the study was defined as any adult diet ordered or any amount of tube feeding administered. This definition was non-specific and may have included patients who were not receiving adequate enteral nutrition to provide gut prophylaxis.

Table 5 Clinical outcomes of stress ulcer prophylaxis, stratified by admission GCS 9–12

Outcomes	SUP 66 (70%)	No SUP 28 (30%)	P value
CSGIBs	0 (0%)	0 (0%)	
All-cause pneumonia	10 (15%)	0 (0%)	**0.03**
Ventilator-associated pneumonia	6 (9%)	0 (0%)	0.09
Clostridium difficile	1 (1%)	0 (0%)	>0.99
Helicobacter pylori	0 (0%)	0 (0%)	
In-hospital mortality	7 (10%)	3 (11%)	>0.99

Bold p-values indicate statistical significance at p<0.05.
CSGIBs, clinically significant gastrointestinal bleeds; GCS, Glasgow Coma Scale; SUP, stress ulcer prophylaxis.

CONCLUSION

In this study of neurocritical care trauma patients, the findings suggest that while approximately 83% received SUP, its universal administration may not uniformly reduce complication rates across all patient groups. While the incidence of CSGIB was low and was exclusive to patients with severe TBI, SUP was associated with a significant reduction in CSGIBs within this subgroup, supporting the potential benefit of considering SUP for patients with higher severity head injury in clinical guidelines. However, higher pneumonia rates, especially among those with severe and moderate head injuries in the SUP group, underscore the need for a nuanced approach in SUP decision-making. Further research is crucial to pinpoint specific clinical factors, including injury severity, influencing CSGIB risk and refining prophylaxis strategies while considering potential complications like pneumonia. These findings highlight the importance of personalized SUP practices to optimize safety and efficacy in neurocritical care settings.

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provided critical article revisions, and approved the final article. DB-O was responsible for the overall content as the guarantor of the study, supervised the study, participated in data interpretation, provided critical article revisions, and approved the final article. All authors provided final approval of the submitted article and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Patient consent for publication Not applicable.

Ethics approval Approval to conduct this retrospective study was obtained from the Institutional Review Boards of the six participating hospitals: HCA-HealthONE IRB, Denver, Colorado (Swedish Medical Center and Wesley Medical Center, 1833851), Medical City Plano Institutional Review Board, Plano, Texas (1876817), CommonSpirit Health Research Institute IRB, Englewood, Colorado (Penrose Hospital and St Anthony Hospital, 1831815), and Western Institutional Review Board (South Texas Health System, 20224094).

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