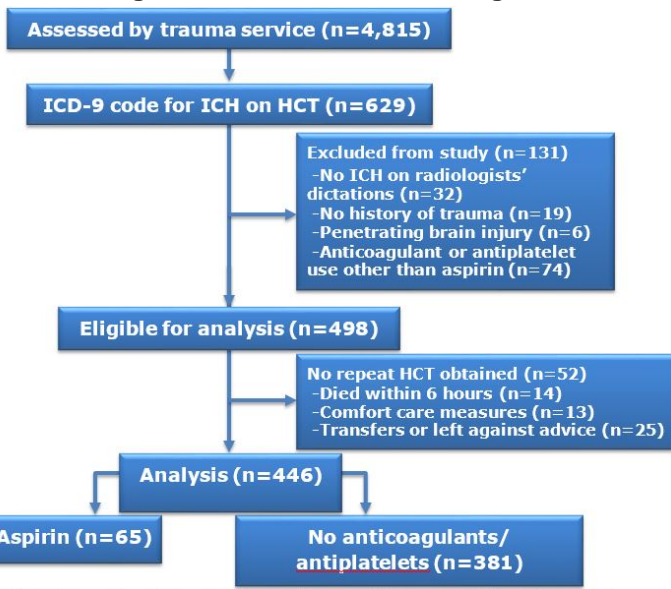


Introduction

- No large studies examine the effect of aspirin monotherapy on progression of intracranial hemorrhage (pICH).
- We hypothesized that patient use of pre-injury aspirin monotherapy is not associated with increased rate of pICH compared with patients not on any anticoagulants or antiplatelet medications.

Figure 1. Patient Selection Diagram



ICD-9, International Classification of Diseases, 9th Revision; ICH, intracranial hemorrhage; HCT, head computed tomography; pICH, progression of intracranial hemorrhage

Methods

- Retrospective cohort study on all adult patients 2010-2011 with intracranial hemorrhage on head computed tomography (CT) after blunt traumatic brain injury
- Primary outcome: pICH on subsequent CT; secondary outcomes of neurosurgical intervention, in-hospital mortality, and discharge to hospice.
- Patients on antiplatelet/anticoagulant medications other than aspirin were excluded.
- Logistic regression modeling evaluated pre-injury aspirin with each outcome.

Table 1. Unadjusted Associations with All Outcomes

	Aspirin	No Anticoagulants/ Antiplatelets	<i>p</i>
N	65	381	
Male, %	53.9	71.1	0.006
Mean age (SD)	73.9 (1.6)	49.9 (1.2)	<0.001
Mean ISS (SD)	18.4 (0.7)	20.3 (0.4)	0.049
Mean head AIS (SD)	3.9 (0.1)	4.0 (0.0)	0.542
Median admission GCS (IQR)	15 (14-15)	14 (12-15)	0.005
Median length of stay (IQR)	3 (2-4)	3 (2-8)	0.160
pICH, %	24.6	28.9	0.481
Mean number HCT performed	3.1 (0.2)	3.2 (0.1)	0.878
Intraparenchymal bleed, %	43.1	45.4	0.727
Intraventricular bleed, %	7.7	9.2	0.697
Subarachnoid bleed, %	58.5	50.7	0.244
Subdural bleed, %	61.5	62.2	0.918
Epidural bleed, %	0.0	11.8	0.003
Other bleed, %	1.5	2.1	0.766
Blood products received, %	26.2	19.7	0.234
Packed red blood cells, %	12.3	11.8	0.909
Fresh frozen plasma, %	13.9	11.0	0.509
Platelets, %	10.8	7.1	0.301
Neurosurgical intervention, %	16.9	21.3	0.424
Intracranial pressure monitor, %	6.2	9.2	0.424
Ventriculostomy, %	0.0	2.1	0.610
Craniotomy, %	10.8	10.8	0.998
Cranielectomy, %	3.1	6.6	0.401
In-hospital death, %	3.1	3.4	1.000
Discharge to hospice, %	6.2	1.6	0.044
Died/hospice combined, %	9.2	5.0	0.169

Bold indicates statistical significance
 SD, standard deviation; ISS, Injury Severity Score; AIS, Abbreviated Injury Scale score; GCS, Glasgow Coma Scale score; IQR, interquartile range; pICH, progression of intracranial hemorrhage; HCT, head computed tomography

Results

- 498 patients identified; 52 excluded due to no available repeat head CT
- Of 446 eligible patients, 65 (14.6%) were on aspirin monotherapy.
- Incidence of pICH among patients taking aspirin was 24.6% vs. 28.9% in those not on anticoagulant/antiplatelet agents ($p=0.48$)
- Between aspirin and no anticoagulant/antiplatelet groups, neurosurgical intervention was performed in 16.9% and 21.3%, respectively ($p=0.42$). In-hospital mortality was 3.1% and 3.4%, respectively ($p=1.00$).
- Adjusted logistic regression models showed no statistically significant associations between aspirin and any outcome.

Table 2. Bivariate Associations of Risk Factors with Outcomes

Risk Factor	pICH		Neurosurgical Intervention		In-hospital Death		Discharge to Hospice	
	OR	CI	OR	CI	OR	CI	OR	CI
Aspirin use	1.24	0.68-2.28	1.33	0.66-2.65	1.11	0.25-5.05	0.24	0.07-0.89
Age (continuous)	0.99	0.99-1.00	0.99	0.98-1.00	1.00	0.99-1.02	1.08	1.03-1.12
Age 45+ years	0.71	0.48-1.04	0.86	0.56-1.32	1.22	0.68-2.21	--	--
Age 55+ years	0.67	0.46-0.97	0.73	0.49-1.10	1.16	0.67-2.01	--	--
Age 65+ years	0.81	0.55-1.19	0.83	0.54-1.27	1.66	0.97-2.85	9.25	2.05-41.68
Age 75+ years	0.76	0.50-1.17	0.73	0.46-1.18	1.22	0.68-2.17	6.44	1.99-20.80
Female sex	0.56	0.36-0.85	0.51	0.31-0.82	0.73	0.40-1.34	0.79	0.24-2.54
Head AIS	1.67	1.26-2.20	8.69	5.65-13.35	5.39	3.28-8.85	2.03	0.91-4.52
Length of stay	1.06	1.04-1.08	1.09	1.07-1.12	0.96	0.92-1.01	1.01	0.96-1.06
Blood products	1.54	1.05-2.27	3.13	2.04-4.80	4.26	2.42-7.50	2.12	0.73-6.13

Bold indicates statistical significance
 pICH, progression of intracranial hemorrhage; OR, odds ratio; CI, 95% confidence interval; AIS, Abbreviated Injury Scale score

Conclusions

- In blunt traumatic brain injury patients, pre-injury aspirin monotherapy is not associated with pICH.
- A prospective study would require 9,166 patients to be powered adequately to show a 4% pICH rate difference.
- Our data suggest that aspirin is a low-risk therapy that appears to be safe to use in this patient population.

Table 3. Adjusted Multivariate Associations with Outcomes

Risk Factor	pICH		Neurosurgical Intervention		In-hospital Death		Discharge to Hospice	
	OR	CI	OR	CI	OR	CI	OR	CI
Aspirin use	1.02	0.53-1.99	1.06	0.44-2.55	1.54	0.26-9.27	0.70	0.17-2.80
Age							1.09	1.03-1.14
Female sex	0.48	0.28-0.82						
Head AIS	1.73	1.22-2.45	11.37	6.53-19.81	27.88	5.63-138.19		
Length of stay	1.04	1.01-1.06	1.07	1.04-1.10	0.89	0.81-0.98		
Blood products	1.97	1.13-3.42	2.47	1.23-4.96	18.20	4.53-73.18	6.82	1.75-26.60

Bold indicates statistical significance
 pICH, progression of intracranial hemorrhage; OR, odds ratio; CI, 95% confidence interval; AIS, Abbreviated Injury Scale score

