Preoperative aspirin and major perioperative outcomes in patients with hypertension undergoing cardiac surgery

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Introduction

- Hypertension is prevalent in patients undergoing cardiac surgery and associated with a higher incidence of cardiovascular complications.
- Aspirin has been shown to prevent cardiovascular events in patients with a high risk of cardiovascular disease.
- Very few studies have investigated aspirin and hypertension, particularly its effects on major outcomes in hypertensive patients undergoing cardiac surgery.[1,2]

Objective

- To determine the effects of preoperative aspirin on postoperative outcomes for patients with hypertension undergoing cardiac surgery.
- To examine the impact of chronic kidney disease and heart failure superimposed with hypertension on outcomes after cardiac surgery.

Methods

- Retrospective cohort study.
- 6,514 consecutive patients from two tertiary hospitals undergoing cardiac surgery from 2001 to 2014, including:
    - Coronary artery bypass graft (CABG), valve surgery, CABG plus valve surgery, and other cardiac surgery
- 3,290 patients had hypertension and met inclusion criteria; they were divided into two groups:
    - With preoperative aspirin or without (control).
- Patients were also divided into three groups based on the presence of additional comorbidities:
    - Hypertension plus heart failure (HHF), hypertension plus chronic kidney disease (HCKD), or hypertension without heart failure or CKD (HTN).
- Outcomes include:
    - Major adverse cardiocerebral events (MACE), 30-day mortality, renal failure, intensive care unit (ICU) stay, and readmission.

❖ CKD, defined as estimated glomerular filtration rate (eGFR) <60 ml/min/1.73m²

❖ MACE includes perioperative myocardial infarction (MI), heart block, cardiac arrest, permanent stroke, transient ischemic attack, coma, and renal failure.

Results

- The aspirin group of hypertensive patients had significantly higher rates of comorbidities including diabetes mellitus, peripheral vascular disease, and previous myocardial infarction compared to the non-aspirin group.
- Among 3,290 patients:
    - 71.2% were taking aspirin preoperatively.
    - 28.8% were not.
- With propensity score adjustment and multivariate logistic regression, this study showed that preoperative aspirin in hypertensive patients undergoing cardiac surgery significantly reduced the risk of (Figure 1, Table 1):
    - 30-day mortality (3.7% vs 6.8%, P = 0.006)
    - postoperative renal failure (4.2% vs 8.0%, P < 0.001)
    - prolonged ICU stay (mean 109.1 vs 133.7 h, P < 0.001)
    - MACEs (9.1% vs 12.7%, P = 0.046)
- There was no significant difference in readmissions between the two groups.
- In addition to hypertension, 13.6% of patients had heart failure and 15.1% had CKD.
- Overall, there was a tendency toward unfavorable outcomes in patients with heart failure and CKD (Table 2):
    - 30-day mortality rates were 4.1%, 4.8%, and 7.1% in the HTN, HCKD, and HHF group respectively.

Table 2. Postoperative complciations and mortality in hypertension patients undergoing cardiac surgery

OUTCOME	HTN	HCKD	HHF	P
MACE	9.8% (238)	9.7 % (48)	12.2% (55)	0.279
Total Hrs ICU (h)	106.32 ± 172.79	123.95 ± 192.28	166.78 ± 266.38	<0.001
Readmission	13.6% (330)	14.5% (72)	17.4% (78)	0.114
30-Day Mortality	4.1% (100)	4.8% (24)	7.1% (32)	0.021

Notes: HTN, hypertension without heart failure or chronic kidney disease; HCKD, hypertension with chronic kidney disease; HHF, hypertension with heart failure. Among patients with HCKD and HHF, 74 had both heart failure and chronic kidney disease.

Table 1. Effects of aspirin on postoperative complications and mortality in hypertension patients undergoing cardiac surgery.

OUTCOME	Preoperative aspirin		Univariate	*P*	Adjusted	*P*
	Yes (2342)	No (948)	OR (95% CI)		OR (95% CI)	
MACE	9.1% (213)	12.7% (122)	0.677 (0.535 - 0.858)	0.001	0.765 (0.589 - 0.995)	0.046
Renal Failure	4.2% (99)	8.0% (76)	0.506 (0.372 - 0.690)	<0.001	0.570 (0.404 - 0.805)	0.001
Total Hrs ICU (h)	109.11 ± 164.77	133.65 ± 223.16		<0.001		
Readmission	14.6% (343)	13.5% (128)	1.099 (0.883 - 1.368)	0.396	1.126 (0.887 - 1.431)	0.329
30-Day Mortality	3.7% (86)	6.8% (64)	0.527 (0.377 - 0.734)	<0.001	0.593 (0.408 - 0.863)	0.006

Discussion

- Preoperative aspirin therapy is associated with a significant decrease in the risk of MACEs, postoperative renal failure, prolonged ICU stay, and 30-day mortality, but does not increase the risk of readmissions in patients with hypertension undergoing cardiac surgery.
- This indicates, for the first time, that preoperative aspirin is beneficial for hypertensive patients undergoing cardiac surgery.
- In addition, hypertensive patients with superimposed CKD or heart failure are at an increased risk of mortality following cardiac surgery compared to patients with hypertension alone.

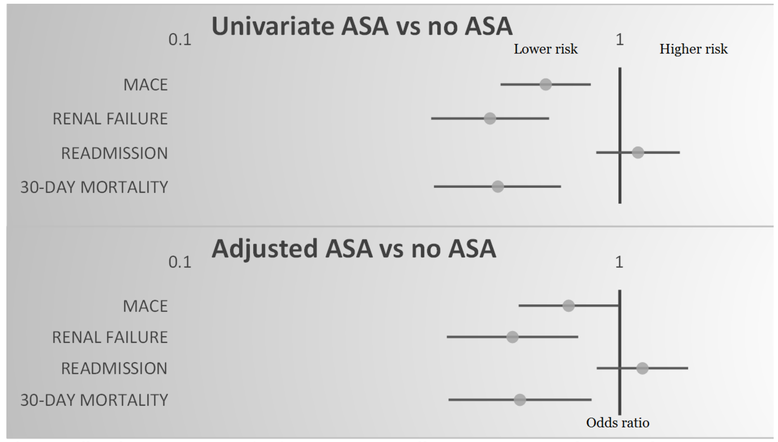

Figure 1. Effect of preoperative aspirin (ASA) on major outcomes of hypertensive patients undergoing cardiac surgery.

References

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