

NSAIDs and Outcomes of Percutaneous Coronary Interventions

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INTRODUCTION & STUDY OBJECTIVES:

Safety concerns about NSAIDs in general and COX-2 selective agents in particular warrant careful consideration before use of these drugs in patients at risk of cardiovascular (CV) events. FDA specifically discourages use of NSAIDs in immediate post-CABG period. Non-selective NSAIDs might also reduce cardio-protective properties of Aspirin (ASA). In accord with FDA recommendations and existing data, AMC Formulary committee in Dec 2005 instituted an "NSAID Auto-Discontinuation" policy in all AMC patients after CABG and in those on ASA for CV indications.

We sought to evaluate contemporary use and outcomes of NSAID therapy in patients undergoing percutaneous coronary intervention (PCI).

MATERIALS AND METHODS:

In 2006, as a part of Quality Improvement initiative and to assess outcomes of this intervention, we conducted a retrospective chart review of all patients with PCI performed between 1/1/2004 and 12/31/2006. No personal identifiers were stored. All consecutive patients undergoing PCI at a single academic tertiary center from 2004 to 2006 were included in the study. Data from NY state angioplasty registry and hospital in-patient drug utilization database were tabulated. Analyses of variance, chi-square, Kaplan-Meier survival curve, and proportional hazard analyses were employed. Study was approved by the institutional IRB.

RESEARCH QUESTION AND HYPOTHESIS:

1. Are we still using NSAIDs in PCI patients?
2. Are NSAIDs associated with worse outcomes in patients getting PCI?

Available data suggests that NSAIDs may be associated with worse outcomes in this patient group

RESULTS:

Of 2970 PCI patients (30% females, 96% on aspirin) only 69 (2%) were treated with NSAIDs; in additional twenty-one (0.5%) Celecoxib was used. Twelve patients received more than one NSAID. Overall use of NSAIDs decreased from 2004-2006 (3, 2, and 1% in 2004-05-06, respectively ; p=0.017) . NSAID-treated patients were younger (57+/-12 in "NSAID", 60+/-11 in "Celecoxib", and 63+/-12 years old in "no NSAID" groups; p<0.001. More patients on NSAIDs had a history of myocardial infarction (p<0.001) and reduced ejection fraction (p=0.003)Table-3.

There was no association between NSAID use and post-PCI in-hospital mortality (p=0.842). However, post-procedural myocardial infarction (MI) was more common in NSAID-treated patients (4% in "NSAID", 0% in "Celecoxib", and 1% in "no NSAID" groups, p=0.015). In addition, post-procedural length of stay was significantly longer in the "NSAID" group (4.2+/- 0.4 days), as compared to "Celecoxib" (1.5+/- 0.2 days) or "no NSAID" groups (2.8 +/-0.1 days; p<0.001)Table-4. Non-selective NSAID use remained a significant predictor (p=0.033) of prolonged hospital stay, even after adjustment for age (p<0.001), ejection fraction (p<0.001), and history of previous (p<0.001) or post-procedural MI (p=0.011) Table-5.

Table 1. Temporal Trends in Utilization of NSAIDs in PCI-treated Patients

Parameter	ns-NSAIDs	Celecoxib	no NSAIDs	p-value
In 2004 of 983 PCI cases, n (%)	32 (3)	8 (1)	923 (96)	
In 2005 of 989 PCI cases, n (%)	24 (2)	5 (0.5)	960 (97)	0.017
In 2006 of 1018 PCI cases, n (%)	13 (1)	3 (0.3)	1002 (98)	

Table 2. Utilization of Non-Steroidal Agents in PCI-treated Patients*

Drug	N patients	Daily Dose (mg) Mean ± SD
Aspirin	2860	317±45
Celecoxib	16	225±77
Ibuprofen	45	1427±866
Naproxen	4	875±250
Ketorolac, PO	18	169±152
Ketorolac, IV	2	45±21
Indomethacin	3	82±65
Diclofenac	3	125±43

*One patient received three different NSAIDs; 12 patients received two different NSAIDs

Table 3. Pre-Procedural Characteristics in PCI-treated Patients

Parameter	ns-NSAIDs	Celecoxib	no NSAIDs	p-value
Total, N/2970 (%)	69 (2)	16 (0.5)	2885 (97)	
Females, n/N (%)	17/69 (25)	8/16 (50)	856/2885 (30)	0.135
Caucasians, n/N (%)	63/69 (91)	15/16 (94)	2610/2885 (90)	0.882
Age (years), Mean±SD	57±11	60±11	63±12	<0.001
Ejection Fraction (days), Mean±SD	48±12	55±6	52±11	0.003
Hx Heart Sx, n/N (%)	12/69 (17)	2/16 (13)	419/2885 (15)	0.779
Hx PCI, n/N (%)	20/69 (29)	6/16 (38)	1058/2885 (37)	0.422
Hx MI, n/N (%)	54/69 (78)	3/16 (19)	1298/2885 (45)	<0.001
Hx CV Dz, n/N (%)	2/69 (3)	2/16 (13)	227/2885 (8)	0.244
Hx PVD, n/N (%)	4/69 (6)	1/16 (6)	176/2885 (6)	0.994
Hx Past CHF, n/N (%)	1/69 (1)	0/16 (0)	44/2885 (2)	0.883
Hx COPD, n/N (%)	5/69 (7)	1/16 (6)	241/2885 (8)	0.906
Hx DM, n/N (%)	16/69 (23)	6/16 (37)	695/2885 (24)	0.45
Hx CRF or HD, n/N (%)	1/69 (1)	1/16 (6)	58/2885 (2)	0.458
Unstable-Shock, n/N (%)	3/69 (4)	0/16 (0)	147/2885 (5)	0.627

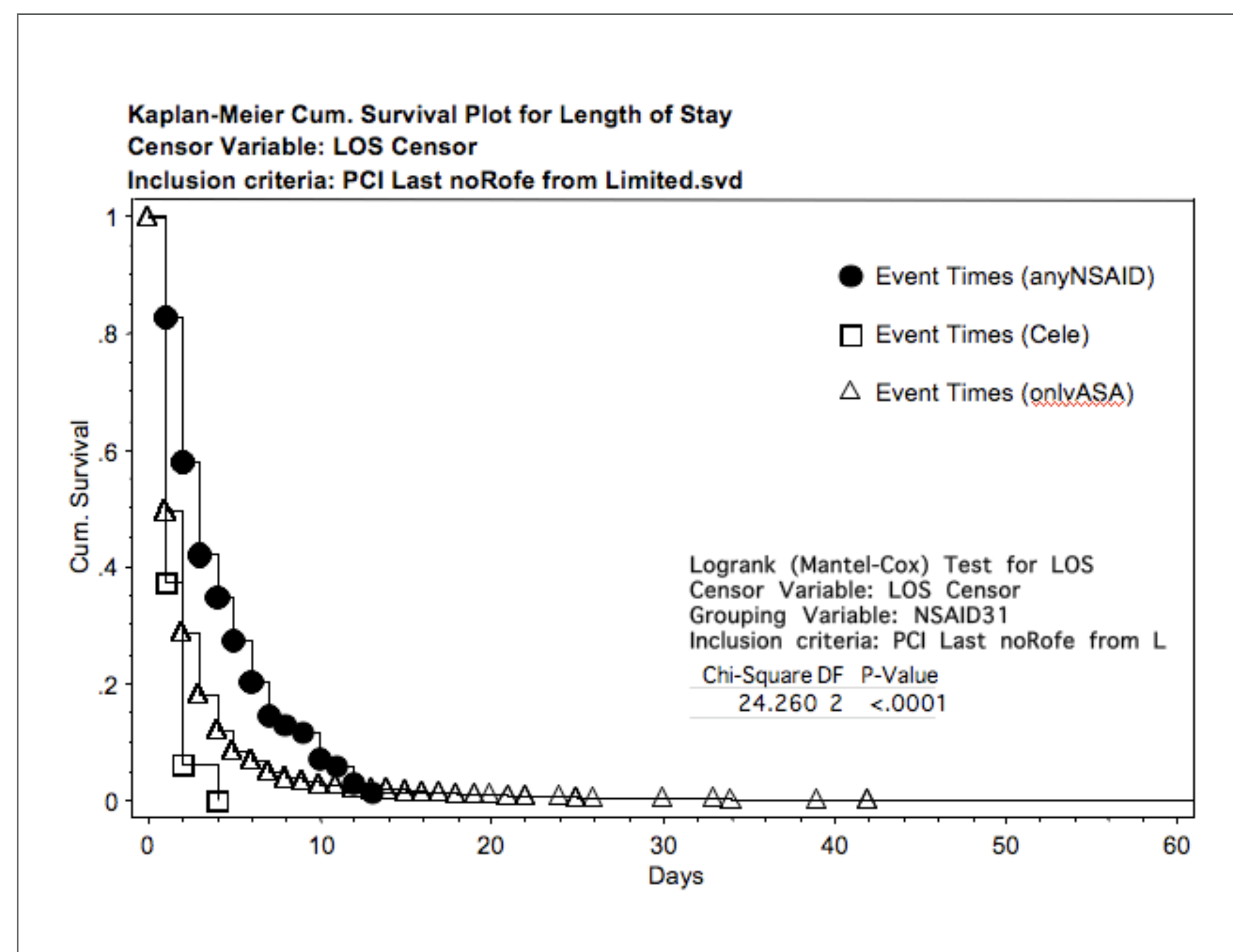
Table 4. Post-Procedural Characteristics in PCI-treated Patients

Parameter	ns-NSAIDs	Celecoxib	no NSAIDs	p-value
Total, N/2970 (%)	69 (2)	16 (0.5)	2885 (97)	
ASA on Discharge, n/N (%)	69/69 (100)	15/16 (94)	2776/2885 (96)	0.244
CVA, n/N (%)	0/69 (0)	0/16 (0)	5/2885 (0.2)	0.929
Acute MI, n/N (%)	3/69 (4)	0/16 (0)	26/2885 (1)	0.015
Renal Failure, n/N (%)	0/69 (0)	0/16 (0)	6/2885 (0.2)	0.915
CHF, n/N (%)	3/69 (4)	0/16 (0)	118/2885 (4)	0.707
Dced Alive, n/N (%)	68/69 (99)	16/16 (100)	2858/2885 (99)	0.842
LOS (days), Kaplan-Meier analysis Mean ±SE, Logrank p-value	4.2±0.4	1.5±0.2	2.8±0.1	<0.001

Table 5. Factors Affecting Length of Hospital Stay

Parameter	Hazard Ratio*	95% CI	p-value
ns-NSAID vs. ASA Only	0.758	0.588-0.978	0.033
Celecoxib vs. ASA Only	1.17	0.704-1.945	0.545
Age (per 10 years)	0.942	0.913-0.972	<0.001
Ejection Fraction (per 10%)	1.141	1.103-1.181	<0.001
Hx of Previous MI vs. No Hx of Previous MI	0.686	0.633-0.743	<0.001
Post-Procedural MI vs. No Post-Procedural MI	0.61	0.417-0.892	0.011

*) Hazard ratio of less than 1 indicates association with prolonged hospital stay



CONCLUSIONS:

We observed a reduction in NSAIDs use in patients undergoing percutaneous coronary revascularization. However, when utilized in this vulnerable population, NSAIDs are associated with increased incidence of peri-procedural MIs and longer post-PCI length-of-stay, as compared to Celecoxib-treated patients and to patients not on any NSAIDs.

The adverse association between NSAID use and length of hospital stay retained significance even when other co-morbidities were adjusted for. Pending results of randomized trials, providers should limit use on non-selective NSAIDs in patients with coronary artery disease undergoing PCI.

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