ECONOMIC BURDEN ASSOCIATED WITH ISO-OSMOLAR VERSUS LOW OSMOLAR IODINATED CONTRAST MEDIA DURING PERIPHERAL ENDOVASCULAR PROCEDURES: EVIDENCE FROM PREMIER DATABASE

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BACKGROUND

- Cardiovascular angiographic procedures are often essential in the diagnosis and treatment of peripheral arterial disease (PAD).
- Iodinated contrast media (CM) are used in peripheral endovascular procedures; however, they are also associated with increased likelihood of adverse renal and cardiovascular events leading to higher mortality[1], prolonged hospitalization and costs[2].
- Prior studies[3-6] have demonstrated lower incidence of major adverse renal and cardiovascular events (MARCE)[6] associated with iso-osmolar iodinated contrast media (IOCM) compared with low-osmolar contrast media (LOCM), including a recent real-world analysis in patients with comorbidities and with PAD undergoing endovascular revascularization[7].

OBJECTIVE

The objective of this study was to evaluate association of IOCM and LOCM use with direct costs and length of hospital stay in patients with comorbidities and with PAD undergoing endovascular revascularization using a contemporary real-world US data source[8].

METHODS

Study Design	Retrospective cohort study
Data Source	Premier Hospital Database[8], a large, US-based source of inpatient administrative claims data
Patient Population	Comorbid patient visits (chronic kidney disease, diabetes, heart failure or advanced age > 75 years) reflecting peripheral endovascular revascularization procedures with IOCM or LOCM between September 2012 and June 2018, as single cohort and separated into claudication and critical limb ischemia (CLI) sub-cohorts
Variables	Diagnoses and procedures identified using ICD-9, ICD-10, and CPT codes; HCRU derived via Premier Chargemaster.
Outcomes	Hospital costs including imaging, pharmacy, room and board, hospital length of stay (LOS) and rate of home discharge (ie, not needing follow-up care)
Analysis	Adjusted multivariable analysis with hospital fixed-effects

RESULTS

20,689 patients with primary diagnosis of claudication or CLI undergoing endovascular revascularization using either IOCM (9,634 patients) or LOCM (11,055 patients) were included in the analysis[7]. Patient demographics and relevant comorbidities are in Table 1.

In the overall cohort, patients who received IOCM had lower hospital LOS (estimated difference 0.96 days, p<.0001), lower total costs (estimated difference of $1,902 per patient, p<0.0001) and higher home discharge rate (estimated difference 3.2% p=0.0002). Claudication and CLI sub-cohorts showed similar outcomes favoring IOCM. (Table 2)

STUDY LIMITATIONS

The Premier hospital database does not track patients longitudinally. Thus, it was not possible to reliably determine adverse events or associated cost and resource utilization after the patient was discharged, as follow-up visits may not have been routinely linked. Due to the administrative nature of the database, lab values (ieg, serum creatinine levels) and procedural information (eg, volume of CM administered) were not available. IOCM was evaluated against multiple pooled LOCM and analyses with individual LOCM were not conducted.

CONCLUSION:

In this retrospective analysis of patients with comorbidities and with peripheral arterial disease undergoing endovascular revascularization, use of IOCM was associated with statistically significantly lower total hospital costs and resource utilization compared with use of LOCM.

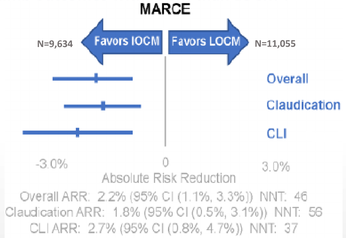
TABLE 1: Patient demographics and comorbid conditions

	Overall				Claudication				CLI			
	IOCM		LOCM		IOCM		LOCM		IOCM		LOCM	
	N	%	N	%	N	%	N	%	N	%	N	%
Total Patients	**9,634**	**100**	**11,055**	**100**	**5,335**	**100**	**6,641**	**100**	**4,299**	**100**	**4,414**	**100**
Age (years)												
Mean	72.8		71.8		71.5		70.7		74.4		73.4	
Std Dev	11.4		11.4		11.1		11.2		11.5		11.5	
Gender, Male	5,171	53.7	6,104	55.2	2,807	52.6	3,591	54.1	2,364	55.0	2,513	56.9
Race												
Caucasian	7,125	74.0	7,855	71.1	4,032	75.6	4,692	70.7	3,093	71.9	3,163	71.7
Black	1,389	14.4	1,738	15.7	712	13.3	1,007	15.2	677	15.7	731	16.6
Other	1,120	11.6	1,462	13.2	591	11.1	942	14.2	529	12.3	520	11.8
CKD	3,282	34.1	3,190	28.9	1,598	30.0	1,721	25.9	1,684	39.2	1,469	33.3
Diabetes	5,883	61.1	6,887	62.3	3,195	59.9	4,077	61.4	2,688	62.5	2,810	63.7

Visual Summary

N = 20,689 comorbid patients with PAD undergoing revascularization (IOCM: N=9,634; LOCM: N=11,055)

Clinical outcomes analysis demonstrated lower incidence of adverse renal, cardiovascular and limb outcomes with IOCM than LOCM[7].



Use of IOCM was also associated with lower resource utilization, e.g.

- **Lower hospital length of stay, by 0.96 days**
- **Lower hospitalization costs, $1,902 per patient**
- **Higher home discharge rate, 3.2%**

ARR, absolute risk reduction; CLI, critical limb ischemia; IOCM, iso-osmolar contrast media; LOCM, low-osmolar contrast media; MARCE, major adverse renal and cardiovascular events; NNT, number needed to treat; RRR, relative risk reduction

TABLE 2: Cost and Resource Utilization associated with IOCM and LOCM in PAD patients

	Overall		Claudication		CLI	
Estimated Differences (calculated as [IOCM value – LOCM value])	**Estimate (CI)**	**p-value**	**Estimate (CI)**	**p-value**	**Estimate (CI)**	**p-value**
Rate of home discharge (%)	3.2 (1.5, 4.9)	**0.0002**	2.8 (0.9, 4.7)	**0.0035**	5.1 (2.1, 8.1)	**0.0009**
ICU length of stay (LOS, days)	-0.21 (-0.29,-0.13)	**<0.0001**	-0.28 (-0.37,-0.18)	**<0.0001**	-0.15 (-0.29, 0.00)	**0.0444**
Total LOS	-0.96 (-1.18,-0.73)	**<0.0001**	-1.02 (-1.24, -0.79)	**<0.0001**	-1.08 (-1.51, -0.64)	**<0.0001**
LOS without ICU stay	0.0 (0.0,0.01)	0.2546	0.01 (-0.01,0.02)	0.2996	0.01 (0.00, 0.02)	0.1172
Total costs ($)	-1,902 (-2,542, -1,263)	**<0.0001**	-1,893 (-2,654, -1,132)	**<0.0001**	-2,215 (-3,327, -1,104)	**<0.0001**

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