Real-World Patient Characteristics and Healthcare Resource Utilization of Patients Undergoing Percutaneous Coronary Interventions in Japan: A Retrospective Claims Analysis

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BACKGROUND

- Drug-eluting stents (DES) and drug-coated balloons (DCBs) are used during percutaneous coronary intervention (PCI) to revascularize occluded or narrowed coronary arteries in patients with acute or chronic coronary syndromes.[1,2]
- Different patient selection criteria and technical approaches to PCI facilitate optimization of patient outcomes with DES- or DCB-based PCIs.[3]
- Understanding the real-world differences in patient and PCI procedural characteristics, including use of imaging and vessel/lesion preparation devices, may inform future clinical practice.

OBJECTIVE

To examine patient characteristics and healthcare resource utilization (HCRU) of patients receiving DCB or DES during percutaneous coronary interventions (PCI) for coronary artery disease (CAD) in Japan.

METHODS

- **Design**: Retrospective cohort study
- **Database**: The Medical Data Vision (MDV) database is a hospital claims database comprised of anonymized hospital data from 532 hospitals in Japan, which cover approximately 30% of acute phase hospitals and data for a total of 50.29 million people.
- **Study population**:
  - _Included:_ Patients aged ≥20 years with ≥1 hospital admission for a PCI procedure (Kubuncodes: K546 to K550, K550-2) due to CAD (ICD 10 code: I20 - I25) between March 1, 2014 and February 29, 2024. During their first PCI admission (index PCI admission), patients must have received either only DCB (PCI-DCB) or only DES (PCI-DES). The claim date of the first DCB or DES received during the index PCI admission was the index date.
  - _Excluded:_ Patients with a history of PCI using bare metal stent, DES, or DCB during the data availability period (starting 1 April 2008), patients who died on the index date, or who received both DCB and DES during the index PCI admission.
- **Statistical analysis**: Patient characteristics and HCRU, including use of imaging and vessel/lesion preparation devices, as well as length and costs of the index PCI admission, were described.

CONCLUSIONS

- Our study highlights differences in HCRU between unmatched PCI-DCB and PCI-DES groups.
- Future studies may elucidate drivers of between-group differences.

LIMITATIONS

- An inherent limitation of retrospective claims data analyses is the potential for misclassification of diagnoses or procedures, due to coding errors or variations in hospital reporting practices.
- Our analysis was limited to data and parameters available in the MDV database; variables such as lesion type and location were not possible to include.

RESULTS

- A total of 20,922 PCI-DCB patients and 188,650 PCI-DES patients were identified.

Patient Characteristics

- Patients had a mean age of approximately 71 years, with a slightly higher proportion of the PCI-DES group being female (25.1% vs. 23.5%, p<0.001) (Table 1).
- Most patients underwent PCI due to an acute coronary syndrome (85.3%) (Table 1).
- Common comorbidities were hyperlipidemia (86.7%), hypertension (83.0%), heart failure (63.9%) and diabetes (60.0%) (Table 1).
- More PCI-DCB patients than PCI-DES patients had high bleeding risk (75.6% vs 73.4%, p<0.001), although the baseline use of anti-thrombotics was similar between groups (Table 1).

Table 1. Patient Baseline Characteristics

	PCI-DCB (N=20,922)	PCI-DES (N=188,650)	Total PCI-DCB or PCI-DES (N=209,572)
Age*			
Mean (SD)	71.5 (10.9)	71.8 (10.6)	71.8 (10.6)
Median (Q1, Q3)	73 (66, 79)	73 (66, 79)	73 (66, 79)
Sex*			
Female	4,911 (23.5%)	47,401 (25.1%)	52,312 (25.0%)
PCI Indication			
Acute coronary syndrome	17,788 (85.0%)	161,048 (85.4%)	178,836 (85.3%)
Medical History			
Hyperlipidemia*	18,328 (87.6%)	163,286 (86.6%)	181,614 (86.7%)
Hypertension	17,384 (83.1%)	156,604 (83.0%)	173,988 (83.0%)
Heart failure*	14,118 (67.5%)	119,893 (63.6%)	134,011 (63.9%)
Diabetes*	13,280 (63.5%)	112,407 (59.6%)	125,687 (60.0%)
Peripheral artery disease*	6,248 (29.9%)	48,680 (25.8%)	54,928 (26.2%)
Current Smoker*	11,657 (55.7%)	102,439 (54.3%)	114,096 (54.4%)
Bleeding Risk+			
Mean bleeding risk score* (SD)	1.8 (1.3)	1.7 (1.2)	1.7 (1.2)
Median bleeding risk score* (Q1, Q3)	1.5 (1, 2.5)	1.5 (0.5, 2.5)	1.5 (0.5, 2.5)
High bleeding risk‡ (N, %)	15,818 (75.6%)	138,427 (73.4%)	154,245 (73.6%)
Anti-thrombotics Use			
Any	19,829 (94.8%)	179,254 (95.0%)	199,083 (95.0%)
Anti-platelet	19,757 (94.4%)	178,803 (94.8%)	198,560 (94.7%)
Direct oral anticoagulant	1,894 (9.1%)	14,432 (7.7%)	16,326 (7.8%)
Warfarin	832 (4.0%)	6,517 (3.5%)	7,349 (3.5%)

*p<0.001 +Bleeding risk score adapted from Matsumoto et. al[4] ‡High bleeding risk defined as 1 or more points

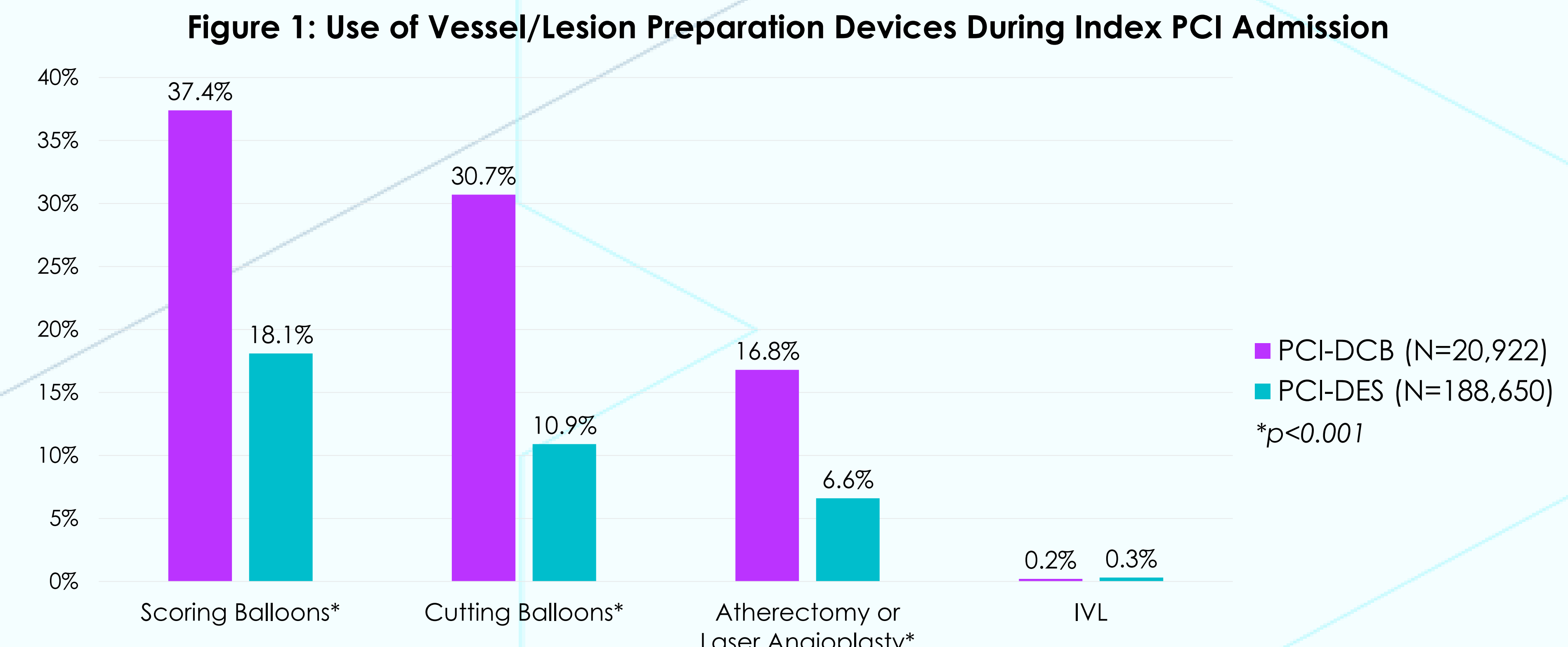### Healthcare Resource Utilization During Index PCI Admission

- Use of intravascular ultrasound (IVUS)-guided PCI was more prevalent than optical coherence tomography (OCT)-guided PCI in both groups (Table 2).
- A significantly higher proportion of PCI-DCB patients than PCI-DES patients received vessel/lesion preparation devices (scoring or cutting balloons, atherectomy, or laser angioplasty); use of intravascular lithotripsy (IVL) was comparable between groups (Figure 1).
- The length and costs of the index PCI admission were significantly shorter and lower for PCI-DCB than PCI-DES patients (mean±SD: 7.5±15.5 vs 9.3±16.5 days, p<0.001; JPY 1,279,194 vs JPY 1,465,170, p<0.001).

Table 2. Use of Intravascular Imaging During Index PCI Admission

	PCI-DCB (N=20,922)	PCI-DES (N=188,650)
IVUS*	15,910 (76.0%)	163,772 (86.8%)
OCT*	4,246 (20.3%)	22,420 (11.9%)

*p<0.001

Figure 1: Use of Vessel/Lesion Preparation Devices During Index PCI Admission

PCI-DCB (N=20,922): Scoring Balloons* 37.4%, Cutting Balloons* 30.7%, Atherectomy or Laser Angioplasty* 16.8%, IVL 0.2%
PCI-DES (N=188,650): Scoring Balloons* 18.1%, Cutting Balloons* 10.9%, Atherectomy or Laser Angioplasty* 6.6%, IVL 0.3%
*p<0.001

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