

Editorial



The Need for Re-evaluation of PCI Practice: from Proceduralists to Clinicians

Min Chul Kim , MD, PhD¹, and Youngkeun Ahn , MD, PhD, FACC, FSCAI^{1,2,3}

¹Division of Cardiology, Department of Internal Medicine, Chonnam National University Hospital, Chonnam National University Medical School, Gwangju, Korea

²Cell Regeneration Research Center, Chonnam National University Hospital, Gwangju, Korea

³BK21 PLUS Center for Creative Biomedical Scientists, Chonnam National University Medical School, Gwangju, Korea

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Correspondence to

Youngkeun Ahn, MD, PhD, FACC, FSCAI

Division of Cardiology, Department of Internal Medicine, Chonnam National University Hospital, Chonnam National University Medical School, 42 Jebong-ro, Dong-gu, Gwangju 61469, Korea.

E-mail: cecilyk@hanmail.net

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ORCID iDs

Min Chul Kim 

<https://orcid.org/0000-0001-6026-1702>

Youngkeun Ahn 

<https://orcid.org/0000-0003-2022-9366>

Conflict of Interest

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After the first percutaneous transluminal angioplasty was performed in 1977, percutaneous coronary intervention (PCI) underwent an evolution, from balloon catheter, bare-metal stents to drug-eluting stents (DES), resulting in decreased cardiovascular mortality over the past 40 years.¹ In Korea, the first balloon angioplasty was performed in 1983 and the first coronary artery stenting in 1991. Since that time, the number of PCI procedures performed has increased markedly and many academic papers have been published on this technique.²

In the current issue, Sung and Hong³ investigated the status and temporal trend of PCI in Korea between 2002 and 2013 based on the National Health Insurance Service-National Sample Cohort (NHIS-NSC). They analyzed 12,186 PCI procedures during the study period. The estimated annual rate of PCI increased from a median of 29.1 (95% confidence interval [CI], 26.6–32.1) per 10,000 person-years in 2002 to 107.7 (95% CI, 103.0–113.8) per 10,000 person-years in 2013. The number of PCI centers also annually increased, from 59 centers in 2002 to 153 centers in 2013. This study provided important information on the trend of PCI from 2002 to 2013.

The increasing rate of PCI during the study period may be due to increases in the use of elective PCI procedures, especially for patients with stable ischemic heart disease (SIHD) rather than acute myocardial infarction (AMI). The effectiveness of PCI for reducing mortality in patients with AMI has been demonstrated in many studies, including a large Korean cohort study.⁴ However, the efficacy of PCI has been disputed, particularly in patients with SIHD.⁵⁽⁶⁾ Until the results of the International Study of Comparative Health Effectiveness with Medical and Invasive Approaches (ISCHEMIA) trial, PCI for SIHD could be considered in patients with a positive non-invasive stress test or typical angina despite optimal medical therapy.⁷⁽⁸⁾ The number of PCI procedures for angina increased between 2013 and 2016.⁹⁽¹⁰⁾ In this study, the proportion of larger hospitals performing PCI was shown to have decreased. The majority (93%) of hospitals had ≥500 beds in 2002 but this proportion decreased to 73% by the year 2013. However, the proportion of large PCI-capable centers (PCI volume ≥500/year) increased markedly, despite a similar number of PCI procedures being performed in 2016 compared to 2014.¹⁰ In our opinion, the increase in PCI procedures for SIHD may be due to

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more PCI procedures being performed in non-tertiary centers. The results of this study could inform policy-making and lead to a decrease in medical expenses by reducing the number of unnecessary PCI procedures. For example, the policy of performing fractional-flow reserve-guided PCI for intermediate stenosis could be re-assessed to decrease unnecessary procedures.

As mentioned in the manuscript, the primary limitation of the current study is the lack of data on baseline clinical characteristics and comorbidities. The independent predictors of all-cause mortality after PCI noted in this study, such as old age, male gender, low socioeconomic status, statin use, antiplatelet use, and diabetes mellitus, have been described previously. The association of mortality with the number of hospital beds remains unclear. In the current study, the number of hospital beds was not an independent predictor of all-cause mortality after PCI; however, a strong relationship between PCI volume and clinical outcomes was seen in real-world Korean data. According to the Korean Percutaneous Coronary Intervention (K-PCI) 2016 registry data, the incidence of major adverse cardiac and cerebral events (a composite of mortality, myocardial infarction, repeat PCI, and stroke) was lower in high- versus low-volume centers.¹⁰⁾ The low mortality rate reported for Jeju Island in this study also represents an interesting finding. However, the proportion of PCIs performed in Jeju Island is low (1.23% in 2014 and 2016)¹⁰⁾¹¹⁾ and regional differences in mortality in Korea after PCI should be further investigated.

In conclusion, the practice of PCI in Korea should be re-evaluated as the number of PCI procedures continues to increase. There have been major developments in PCI devices, including next-generation DES, improved overall medical care, and optimized medical therapy. Consequently, mortality and repeat PCI rates have decreased markedly. Unnecessary procedures are problematic and careful discussion is required to decrease the rate of unnecessary PCIs, based on the results of current studies and large randomized trials, particularly in patients with SIHD. Interventional cardiologists should be 'clinicians' and not 'proceduralists'.

REFERENCES

1. Benjamin EJ, Muntner P, Alonso A, et al. Heart disease and stroke statistics-2019 update: a report from the American Heart Association. *Circulation* 2019;139:e56-528.
[PUBMED](#) | [CROSSREF](#)
2. Park SJ, Shim WH, Ho DS, et al. A paclitaxel-eluting stent for the prevention of coronary restenosis. *N Engl J Med* 2003;348:1537-45.
[PUBMED](#) | [CROSSREF](#)
3. Sung J, Hong KP. Descriptive study on the Korean status of percutaneous coronary intervention using National Health Insurance Service-National Sample Cohort (NHIS-NSC) database: focused on temporal trend. *Korean Circ J* 2019;49:1155-63.
[PUBMED](#) | [CROSSREF](#)
4. Kim Y, Jeong MH, Ahn Y, et al. Results of a 10-year experience in Korea using drug-eluting stents during percutaneous coronary intervention for acute myocardial infarction (from the Korea Acute Myocardial Infarction Registry). *Am J Cardiol* 2018;122:365-73.
[PUBMED](#) | [CROSSREF](#)
5. Sedlis SP, Hartigan PM, Teo KK, et al. Effect of PCI on long-term survival in patients with stable ischemic heart disease. *N Engl J Med* 2015;373:1937-46.
[PUBMED](#) | [CROSSREF](#)
6. Al-Lamee R, Thompson D, Dehbi HM, et al. Percutaneous coronary intervention in stable angina (ORBITA): a double-blind, randomised controlled trial. *Lancet* 2018;391:31-40.
[PUBMED](#) | [CROSSREF](#)

7. Weintraub WS, Spertus JA, Kolm P, et al. Effect of PCI on quality of life in patients with stable coronary disease. *N Engl J Med* 2008;359:677-87.
[PUBMED](#) | [CROSSREF](#)
8. ISCHEMIA Trial Research Group, Maron DJ, Hochman JS, et al. International Study of Comparative Health Effectiveness with Medical and Invasive Approaches (ISCHEMIA) trial: rationale and design. *Am Heart J* 2018;201:124-35.
[PUBMED](#) | [CROSSREF](#)
9. Han S, Park GM, Kim YG, et al. Trends, characteristics, and clinical outcomes of patients undergoing percutaneous coronary intervention in Korea between 2011 and 2015. *Korean Circ J* 2018;48:310-21.
[PUBMED](#) | [CROSSREF](#)
10. Shin DH, Kang HJ, Jang JS, et al. The current status of percutaneous coronary intervention in Korea: based on year 2014 & 2016 cohort of Korean Percutaneous Coronary Intervention (K-PCI) registry. *Korean Circ J* 2019;49:e96.
[PUBMED](#) | [CROSSREF](#)
11. Jang JS, Han KR, Moon KW, et al. The current status of percutaneous coronary intervention in Korea: based on year 2014 cohort of Korean Percutaneous Coronary Intervention (K-PCI) registry. *Korean Circ J* 2017;47:328-40.
[PUBMED](#) | [CROSSREF](#)