Technology Guidance

Sirolimus-coated percutaneous transluminal coronary angioplasty balloon catheters (SCBs)

for patients with coronary artery disease (CAD)

Technology Guidance from the MOH Medical Technology Advisory Committee

Guidance Recommendations

The Ministry of Health's Medical Technology Advisory Committee has recommended subsidy for sirolimus-coated percutaneous transluminal coronary angioplasty balloon catheters (SCBs) in patients with coronary artery disease (CAD), where percutaneous coronary intervention (PCI) is indicated when:

- ✓ SCB is used as an alternative to drug-eluting coronary stents in certain lesions (such as in-stent restenosis [ISR], small vessel [e.g. < 2.5 mm], or long diffuse disease [e.g. >30 mm]) where:
  - The insertion of drug-eluting coronary stents is not appropriate or technically possible; or
  - There are clinical reasons to minimise duration of antiplatelet treatment (e.g. increased risk of bleeding, need for surgical intervention); OR

- ✓ Paclitaxel-coated percutaneous transluminal coronary angioplasty balloon catheters (PCB) have previously been used but failed (e.g. recurrent ISR previously treated with PCB, challenging coronary anatomy, unavailable size or length of PCB).

Funding status

SCB is recommended for subsidy for treatment of coronary lesions in patients with CAD, in line with the abovementioned recommendations. Subsidies apply only to models listed in the Annex of this guidance.

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Factors considered to inform the recommendations for funding

Technology evaluation

1.1. The MOH Medical Technology Advisory Committee ("the Committee") considered the evidence presented for the technology evaluation of SCBs for the treatment of coronary lesions in patients with CAD. The Agency for Care Effectiveness (ACE) conducted the evaluation in consultation with clinical experts from public healthcare institutions. Published clinical and economic evidence for SCBs was considered in line with its registered indication.

1.2. The evidence was used to inform the Committee's deliberations around five core decision-making criteria:

- Clinical need of patients and nature of the condition;
- Overall benefit of the technology for the patient and/or the system;
- Cost-effectiveness (value for money) – the incremental benefit and cost of the technology compared to existing alternatives;
- Estimated annual technology cost and the number of patients likely to benefit from the technology; and
- Organisational feasibility, which covers the potential impact of adopting technology, especially barriers for diffusion.

1.3. Additional factors, including social and value judgments, may also inform the Committee's deliberations.

Clinical need

2.1. CAD refers to the narrowing or blockage of coronary arteries due to plaque build-up within the arteries. This can cause inadequate oxygen-rich blood to the heart muscle causing ischaemic heart disease, showing symptoms such as shortness of breath and chest pain. In Singapore, ischaemic heart disease accounted for about 21% of total deaths and was the second principal cause of death in 2020.

2.2. The management of ischaemic heart disease includes coronary angioplasty and stent placement. Drug-coated balloons (DCBs) are PCIs that may be used in vessel lesions where drug-eluting coronary stents (DES) cannot be delivered or are expected to perform poorly, such as in small vessels and bifurcated lesions. DCBs combine the mechanical expansion of a balloon catheter with an antiproliferative drug to treat de novo lesions and in-stent restenosis (ISR) in patients with CAD.

2.3. PCBs are the common DCBs used for patients with de novo lesions and ISR who are not suitable for DES based on their angiographic results. Sirolimus is an alternative antiproliferative drug to paclitaxel used to coat coronary balloons. When compared

with paclitaxel, it has a broader therapeutic window and the ability to suppress neutrophilic leukocyte activation and transmigration which may precipitate adverse coronary events such as restenosis.

Overall benefit of technology

3.1. The Committee acknowledged that in patients with de novo lesions and ISR where DES is not suitable, the main comparator for SCBs is PCBs.

3.2. The Committee noted that the available evidence base was of low to moderate quality, comprising one randomised controlled trial (RCT), one propensity-score matched study (PSM) and seven registry studies.

3.3. The Committee noted that in patients with de novo lesions, based on low quality clinical evidence with follow-up of up to one year, SCB was considered safe. Six single-arm registry studies reported low rates of mortality (i.e. all-cause, cardiac), target lesion revascularisation, myocardial infarction and major adverse cardiac events. At up to one-year follow-up, no acute vessel closure and stent thrombosis was reported. The Committee noted that there was lack of comparative effectiveness evidence of SCBs and PCBs in patients with de novo lesions alone. In one small registry study (n=20) at six-month follow-up, SCBs showed acceptable clinical effectiveness outcomes e.g. in-segment late lumen loss bailout stenting, subsequent PCB, and binary restenosis events.

3.4. The Committee acknowledged that in patients with ISR, based on low to moderate quality comparative evidence, SCB was likely to be as safe and effective as PCBs. At up to one-year follow-up, SCBs were comparable to PCBs in terms of all-cause mortality, target lesion revascularisation, acute vessel closure and/or stent thrombosis, late lumen loss and unscheduled angiography. In two single-arm registry studies with follow-up of six months to one year, SCBs demonstrated acceptable rates of bailout stenting, subsequent interventions such as PCBs and coronary artery bypass graft surgery and binary restenosis.

3.5. The Committee noted that based on low-level and low-quality evidence of mixed patient populations with de novo lesions and ISR, SCB was likely to be as safe as PCBs in terms of all-cause mortality, target lesion revascularisation, myocardial infarction and major adverse cardiac events. In the absence of comparative effectiveness evidence, six single-arm registry studies showed that SCBs were potentially clinically effective, reporting high procedural success rates (98.6% to 100%) and low bailout stenting rates (<10%) at follow-up of up to two years.

Cost effectiveness

4.1. The Committee noted that no published cost-effectiveness analyses for SCBs in patients with CAD with de novo lesions or ISR were identified.

4.2. The Committee noted that given similar clinical benefits between SCBs and PCBs, SCBs may be considered a reasonable alternative if it is priced no higher than PCBs. The Committee further noted that Taiwan reimbursed SCBs at prices similar to PCBs.

Estimated annual technology cost

5.1. Based on the projection of about 60 patients with de novo lesions and 241 patients with ISR who could benefit from Government subsidy annually, the Committee noted that the estimated annual cost impact to the public healthcare system was estimated to be <SG$1 million.

Organisational feasibility

6.1. The Committee noted that no major organisational feasibility issues of using SCBs were identified.

Additional considerations

7.1. The Committee noted that at the time of evaluation, there were seven ongoing comparative studies of SCBs and PCBs – four in patients with de novo lesions and three in patients with ISR – expected to be completed within the next two years.

Recommendations

8.1. Based on the available evidence showing acceptable safety and clinical effectiveness of SCBs, the Committee recommended subsidising SCBs for the treatment of coronary lesions in patients with CAD, where PCI was indicated when:

- SCB is used as an alternative to drug-eluting coronary stents in certain lesion subsets (such as ISR, small vessel [e.g. <2.5 mm], or long diffuse disease [e.g. >30 mm]) where:
    - The insertion of drug-eluting coronary stents is not appropriate or technically possible; or
    - There are clinical reasons to minimise duration of antiplatelet treatment (e.g. increased risk of bleeding, need for surgical intervention); or

- PCB was previously used but failed (e.g. recurrent ISR previously treated with PCB, challenging coronary anatomy, unavailable size or length of PCB).

8.2. Subsidies apply only to models listed in the Annex of this guidance.