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No Stents, No Bypass Surgery: A Cultural Shift Toward Drug-Coated Balloons in Indonesia

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Abstract

In many Southeast Asian countries, including Indonesia, there is a notable cultural reluctance toward invasive cardiovascular procedures such as coronary artery bypass grafting (CABG) and the implantation of permanent foreign bodies like coronary stents. Beyond this cultural aversion, drug-coated balloon (DCB) technology offers distinct clinical advantages over drug-eluting stents (DES), including eliminating permanent implants, preserving vascular integrity, and reducing the need for prolonged dual antiplatelet therapy.

In recent years, the clinical indications for DCB use have expanded significantly now encompassing not only in-stent restenosis (ISR) and small vessel disease but also de novo lesions of all sizes, acute myocardial infarction, left main and ostial lesions, bifurcation lesions, chronic total occlusions, long and diffuse disease, heavily calcified lesions, vulnerable plaques, and patients at high bleeding risk or with anticipated non-compliance.

This article examines the sociocultural and clinical factors driving the adoption of DCB technology. It highlights our experience at the Cardiac Centre of Bethsaida Hospital, pioneered by Prof. Dasaad Mulijono, where the integration of DCB interventions with a plant-based diet (PBD) program has resulted in restenosis rates as low as 2%—a stark contrast to the 10–20% commonly reported at other centres. We also present evidence from computed tomography coronary angiography (CTCA) and coronary angiography demonstrating atherosclerosis regression in patients adhering to the PBD approach.

Given the proliferation of unproven and potentially harmful therapies, such as chelation therapy, enhanced external counterpulsation (EECP), and unvalidated thrombectomy techniques, knowledgeable and dedicated physicians must proactively educate patients about evidence-based treatment options. Furthermore, integrating artificial intelligence (AI) presents a transformative opportunity to personalize patient education, enhance clinical decision-making, and guard against misinformation and medical fraud.

As the landscape of coronary artery disease (CAD) management continues to evolve, the appropriate utilization of DCB technology, combined with patient-centred education and holistic care models, represents a critical step forward in improving cardiovascular outcomes across diverse populations.

Keywords: Drug-coated balloon; Coronary artery disease; Restenosis; Plant-based diet, Bethsaida hospital; Prof. Dasaad Mulijono; Artificial intelligence in healthcare; Cultural perceptions in medicine; Atherosclerosis reversal; Chelation therapy; Enhanced external counterpulsation; Thrombectomy device; Medical fraud prevention

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Introduction

Invasive cardiovascular procedures, including CABG and percutaneous coronary interventions (PCIs) involving stent placement, have become the mainstay of treatments in Western cardiology practice. However, in Indonesia and among broader Asian populations, cultural and perceptual hesitation exists regarding these interventions. Traditional health beliefs, fear of foreign materials within the body, and historical scepticism regarding invasive procedures have driven the preference for less invasive alternatives [1-3]. DCB technology has emerged as a promising option, offering a non-stent-based approach that aligns more closely with patient preferences while maintaining clinical efficacy.

Cultural and Sociological Perspectives: Reluctance Toward Invasive Procedures

The hesitance toward invasive cardiac procedures in Indonesian and other Asian communities is multifactorial. Deeply ingrained cultural beliefs often emphasise natural healing and minimal interference with the body's inherent balance [4-6]. The concept of implanting a foreign body whether it be a coronary stent or prosthetic material can evoke concerns regarding long-term compatibility, the potential for complications, and even ethical or spiritual dissonance. This cultural mindset is compounded by anecdotal experiences and historical mistrust in specific healthcare interventions, contributing to a pervasive preference for non-invasive or minimally invasive therapeutic strategies.

Impact on Treatment Decisions

Patients' reluctance to undergo procedures perceived as invasive has influenced the clinical landscape, prompting cardiologists and interventionalists to consider alternative approaches. The adoption of DCB technology has been particularly noteworthy, as it aligns with patient values while offering comparable outcomes in treating various coronary pathologies. The patient-centric approach in regions such as Indonesia emphasises informed decision-making, wherein the risks of traditional stenting and bypass surgery are weighed against innovative, less invasive alternatives.

Comparative Advantages of DCBs Over DES

DES has long represented the standard of care in the percutaneous management of CAD. While DES technology has significantly improved clinical outcomes compared to bare-metal stents, it has limitations. The deployment of a permanent metallic scaffold can introduce a range of complications, particularly in patients with heightened inflammatory responses or cultural aversions to foreign body implantation.

Limitations and Complications Associated with DESs

A substantial body of literature has emerged over the past decade, comparing DESs and DCBs to evaluate their advantages and limitations across various clinical settings. These comparative studies, encompassing randomized controlled trials, meta-analyses, and large-scale registries, have provided critical insights into each modality's efficacy, safety profiles, and long-term outcomes. While DES has traditionally been the standard of care for a wide range of coronary artery lesions, increasing evidence supports the non-inferiority—and in select scenarios, the superiority—of DCB [7-20].

The challenges associated with DES include:

1. **Delayed endothelialization** increases the risk of late stent thrombosis.
2. **Alteration of vessel geometry and biomechanics**, which may compromise physiological vascular function.
3. **Chronic inflammation and irritation**, including possible allergic reactions to the polymer or metal alloy.
4. **Development of neoatherosclerosis**, a progressive form of vascular remodelling within the stent.
5. **Mechanical issues such as stent fracture**, leading to target lesion failure.
6. **ISR**, which may be caused by local hypersensitivity or mechanical underexpansion.
7. **The necessity for prolonged dual antiplatelet therapy (DAPT)**, increasing the risk of bleeding, particularly in elderly or high-risk patients.

Advantages of the "Leave Nothing Behind" Strategy with DCBs

DCBs offer a fundamentally different therapeutic approach by delivering antiproliferative agents directly to the vessel wall, eliminating the need to implant a permanent device. This "leave nothing behind" strategy yields several key clinical and procedural advantages [7-17]:

1. **Preservation of native vessel architecture and vasomotor function**, supporting long-term physiological remodelling.
2. **Late lumen enlargement and positive vessel remodelling**, potentially contributing to plaque regression and favourable hemodynamic adaptation.
3. **Reduction in procedural complexity**, with shorter fluoroscopy time and lower radiation exposure.
4. **Facilitation of future surgical options**, such as coronary artery bypass grafting, due to the absence of metallic implants.
5. **DCBs reduce the need for prolonged DAPT,** making them suitable for patients with active bleeding, high bleeding risk, or upcoming surgical interventions.

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6. **Cultural compatibility**, particularly in Asian populations, including Indonesians, who frequently express reluctance toward permanent foreign body implantation.
7. **Suitability in patients with suboptimal medication adherence** is critical in settings where non-compliance may reach up to 50%.
8. **Viability in populations with high inflammation burdens,** where adherence to lifestyle modifications is limited and stent-related inflammation poses an additional risk.
9. **DCB's ability to preserve native vasculature** makes it ideal for younger patients, where long-term outcomes and technological adaptability are paramount.
10. **Avoid complications associated with stent failure,** particularly in ISR cases linked to hypersensitivity or suboptimal initial implantation.

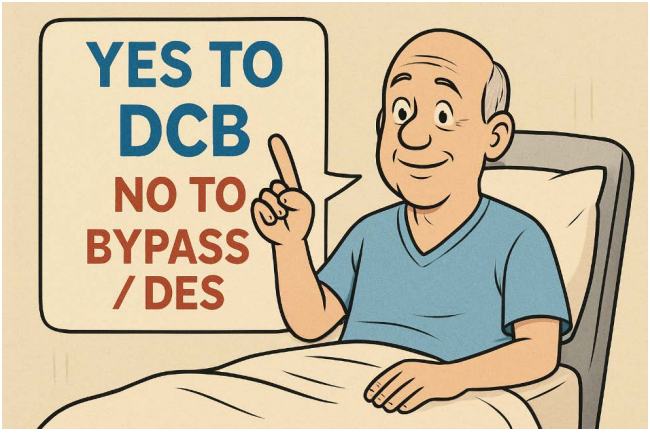
Broadened Clinical Utility of DCBs in Complex Coronary Lesions

Recent advancements have significantly broadened the indications for DCB therapy. Initially applied to manage ISR and small vessel disease, the utility of DCBs now extends to a variety of complex coronary lesions, including:

- **De Novo Lesions:** Applicable in vessels of all sizes [21-30].
- **Acute Myocardial Infarction:** Offering a potential alternative in the acute setting [31-35].
- **Left Main and Ostial Lesions:** Addressing high-risk anatomical locations [9, 36,37].
- **Chronic Total Occlusions:** Providing a therapeutic option where traditional interventions may be limited [38-40].
- **Bifurcations:** Enhancing Treatment Options in Challenging Anatomical Contexts [41-44].
- **Severely Calcified Lesions, Long, Diffuse Lesions:** Addressing the Spectrum of Coronary Artery Disease with Tailored Pharmacotherapy [45-51].
- **High Bleeding Risk Patients:** Offering a safer profile by potentially reducing the need for prolonged dual antiplatelet therapy [52-54]
- **Vulnerable plaques:** refer to lesions with intermediate degrees of stenosis that may not appear hemodynamically significant but possess high-risk morphological features, rendering them prone to rupture and capable of precipitating acute coronary events [55-57].

Clinical Experience at Cardiac Centre, Bethsaida Hospital

At Cardiac Centre, Bethsaida Hospital, a novel integrative approach has been adopted that combines DCB technology with a PBD program. This multidisciplinary strategy aims not only to treat CAD but also to address its underlying atherosclerotic pathology. Clinical outcomes have been impressive, with a reported restenosis rate of 2%, a significant improvement over the approximately 10-20% rate observed in other centres. Additionally, serial CTCA combined with coronary angiography studies have demonstrated reversal of atherosclerotic changes, underscoring the potential of dietary intervention in cardiovascular disease management [58-61].



Challenges with Unproven Therapies and the Role of AI

Unproven Interventions in Cardiovascular Care

The fear and avoidance of invasive cardiovascular procedures are frequently compounded by the widespread promotion of unproven and scientifically unsubstantiated therapies, which often target vulnerable patient populations. Interventions such as chelation infusion, EECP, and specific thrombectomy-based techniques—particularly those marketed in neighbouring regions, including parts of Malaysia—have not consistently demonstrated reliable clinical efficacy in controlled studies. A recurring concern is the inappropriate expansion of indications beyond what is supported by evidence-based guidelines. For instance, EECP is specifically indicated for patients with refractory angina who are not suitable candidates for revascularization via PCI or CABG [62,63]. Yet, it is often promoted indiscriminately for all forms of CAD [64,65]. Similarly, chelation therapy, which lacks robust clinical validation for coronary atherosclerosis, is frequently advertised as a universal treatment for coronary obstruction.

The propagation of such interventions—often described within the medical community as pseudoscientific or even "quackery"—poses a significant threat to patient safety, undermines trust in the healthcare system, and may result in delayed or inappropriate care by diverting patients away from proven, evidence-based therapies. However, the arrival of DCB therapy into the Indonesian interventional

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cardiology market has significantly shifted this landscape. The availability of DCB—an evidence-based, minimally invasive, and effective modality for select cases of CAD—has altered patient preferences. The desire to fall into the trap of unproven treatments such as chelation, EECP, and thrombectomy has notably decreased. Instead, there is now a growing wave of acceptance, as many patients who previously relied on unvalidated therapies are actively seeking DCB as a safer and more scientifically grounded alternative.

Integrating AI for Patient Education

AI is valuable for enhancing patient education and clinical decision-making in this complex therapeutic landscape. AI algorithms can assimilate vast amounts of clinical data and literature to provide personalised treatment recommendations grounded in evidence-based medicine. By integrating AI into patient education platforms, healthcare providers can provide clear and accurate information about the risks and benefits of various coronary interventions. This technology also holds promise in identifying and flagging unproven or potentially fraudulent therapies, thereby protecting patients from exploitation and ensuring adherence to high standards of clinical care [66-68].

At Bethsaida, we actively educate our patients to differentiate between unproven and scientifically validated therapies. Recognising the power of digital tools, we also coach our patients to utilize AI platforms, such as ChatGPT, to evaluate and cross-check medical information critically. The results have been outstanding. Not only have patients become more confident in making informed decisions, but many have also emerged as ambassadors in their communities, helping to spread accurate, up-to-date knowledge about the latest advances in CAD management. This grassroots movement has proven invaluable in countering misinformation and fostering a more informed, health-literate society.

Conclusion

The cultural predisposition among Indonesian and broader Asian populations to avoid invasive cardiac procedures has catalysed a shift towards less invasive modalities, notably DCB technology. The expanded clinical indications for DCB and its favourable profile compared to DESs make it a desirable option in regions where traditional interventional methods are met with scepticism. Furthermore, innovative approaches, such as integrating a PBD at Cardiac Centre Bethsaida Hospital, demonstrate the potential for synergistic strategies that not only treat but may also reverse CAD. As the field of interventional cardiology continues to evolve, the incorporation of AI promises to enhance patient education further and safeguard against the encroachment of unproven therapies, ensuring that clinical decisions remain both culturally sensitive and scientifically robust.

Conflict of Interest: The authors declare no conflict of interest.

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