CLINICAL STUDY

Long-Term Effectiveness of the Zilver PTX Drug-Eluting Stent for Femoropopliteal Peripheral Artery Disease in Patients with No Patent Tibial Runoff Vessels—Results from the Zilver PTX Japan Post-Market Surveillance Study

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ABSTRACT

Purpose: To evaluate 2-year results of the Zilver PTX (Cook Medical, Bloomington, Indiana) drug-eluting stent (DES) for femoropopliteal peripheral artery disease (PAD) in patients with no continuous patent infrapopliteal runoff arteries compared with patients with $\geq$ 1 continuous patent runoff vessels.

Materials and Methods: A retrospective analysis of patients with femoropopliteal PAD enrolled in the Zilver PTX Post-Market Surveillance Study in Japan was performed. There were no exclusion criteria. Outcomes, including freedom from target lesion revascularization (TLR), patency, and clinical benefit, for the no-runoff group (n = 54) were compared with the runoff group (n = 846).

Results: The 2 groups were similar in terms of demographics, lesion characteristics, and comorbidities ($P > .05$). There was a higher incidence of critical limb ischemia in the no-runoff group compared with the runoff group (44.8% vs 19.7%; $P < .01$). There were 3 amputations (5.6%) in the no-runoff group versus 7 amputations (0.8%) in the runoff group ($P = .02$). At 2 years, freedom from TLR rates were 81.3% versus 83.8% ($P = .87$), patency rates were 68.4% versus 70.7% ($P = .95$), and clinical benefit rates were 73.7% versus 80.0% ($P = .16$) in the no-runoff versus runoff group, respectively.

Conclusions: Results in patients with no continuous patent tibial runoff were favorable through 2 years and similar to results for patients with $\geq$ 1 continuous patent runoff vessels, indicating that the Zilver PTX DES may be a valid treatment option for patients with these difficult-to-treat lesions.

ABBREVIATIONS

ABI = ankle-brachial index, CLI = critical limb ischemia, DES = drug-eluting stent, ISR = in-stent restenosis, PAD = peripheral artery disease, TLR = target lesion revascularization

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RESEARCH HIGHLIGHTS:

- In a real-world study, 54 patients with no patent runoff vessels were treated—a population where poor tibial runoff is commonly considered to be a negative predictor of outcomes for revascularization of the femoropopliteal artery.
- Two-year target lesion revascularization, patency, and clinical benefit for patients with no patent runoff vessels were similar to results for patients with ≥ 1 runoff vessels and were favorable compared with results previously reported for other percutaneous treatments and surgical bypass in this high-risk patient population.
- This drug-eluting stent may provide a suitable treatment option for the challenging subgroup of patients with no patent runoff to the foot.

The development of new devices and techniques has led to the adoption of percutaneous approaches as a first choice for peripheral artery disease (PAD), including for many more challenging cases that historically may not have been treated percutaneously (1). One of these percutaneous devices is the Zilver PTX (Cook Medical, Bloomington, Indiana) nitinol self-expanding drug-eluting stent (DES) with paclitaxel coating, which has been shown in clinical trials to be safe and effective for treatment of PAD of the above-the-knee femoropopliteal artery, with superior outcomes compared with percutaneous transluminal angioplasty (PTA) and encouraging durability through 5 years (2–4). However, clinical trials often have strict exclusion criteria, making it harder to translate the results into clinical practice when dealing with more challenging patients with several risk factors for treatment failure.

Poor tibial runoff is commonly considered to be a negative predictor of outcomes for revascularization of the femoropopliteal artery (5). Several studies have reported lower patency rates for patients with poor runoff following surgical bypass (6), PTA (7,8), and placement of self-expanding nitinol stents (9,10). Although specific guidelines for patients with poor infrapopliteal runoff have not been defined, the Society for Vascular Surgery recommends caution in the use of interventions for patients with intermittent claudication and poor runoff (11).

The DES has been shown to be effective for TransAtlantic Inter-Society Consensus class II C/D lesions (12) and in patients presenting with in-stent restenosis (ISR) (13), both notoriously challenging conditions. Therefore, we hypothesized that patients with poor tibial runoff might also achieve better outcomes with the Zilver PTX DES. The Zilver PTX Japan Post-market Surveillance Study (ClinicalTrials.gov identifier NCT02254837) enrolled a large number of patients with long, complex lesions and patients with no continuous patent runoff vessels to the foot. The 2-year outcomes in this real-world study are reported here for patients with no patent below-the-knee runoff vessels compared with outcomes for patients with ≥ 1 patent runoff vessels.

MATERIALS AND METHODS

The Zilver PTX Post-market Surveillance Study was a multicenter, prospective study that enrolled 905 consecutive patients with symptomatic PAD involving the above-the-knee femoropopliteal arteries treated with the Zilver PTX DES at 95 institutions in Japan (14). The study was regulated by the Japanese Ministry of Health, Labour and Welfare and was conducted in accordance with Japanese Good Post-Market Surveillance Practice Regulations. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee. Informed consent processes were determined by ethical committee policy at each institution. For the purpose of the current analysis, the patient population was divided into 2 subgroups based on the site-reported status of the tibial runoff vessels assessed by angiography before stent implantation: no-runoff group (patients who did not have any continuous patent runoff vessels to the foot) and runoff group (patients with ≥ 1 continuous patent runoff vessel).

Study Device and Interventions

The DES is a self-expanding nitinol stent with a polymer-free paclitaxel coating (3 μg/mm^2 dose density). Stents were oversized by 1–2 mm with respect to the reference vessel as per the manufacturer's recommendations and placed at least 1 cm below the superior femoral artery origin and above the medial femoral epicondyle. Pre-dilation and post-dilation and treatment of the inflow and outflow disease were at the physician's discretion. The number of continuous patent runoff vessels before stent implantation was reported, which reflects the status following any treatment of the outflow vessels before implantation of the stent. The antiplatelet regimen recommended for all patients was clopidogrel or ticlopidine starting at least 24 hours before the procedure or a procedural loading dose, continued clopidogrel or ticlopidine therapy for at least 60 days after the procedure, and lifelong aspirin therapy. Clinical assessment before the procedure consisted of Rutherford classification and ankle-brachial index (ABI).

Follow-up Assessment and Definitions

Rutherford class and ABI were assessed before hospital discharge and at 1 and 2 years. Clinical benefit was defined as freedom from persistent or worsening symptoms of ischemia (ie, claudication, rest pain, ulcer, tissue loss) after the initial study treatment. Stent integrity was assessed by radiography at 1 year. Clinically driven target lesion revascularization (TLR) was defined as reintervention performed for ≥ 50% diameter stenosis within ± 5 mm of the target lesion after documentation of recurrent clinical symptoms of PAD. Patency was evaluated by duplex