Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Surgery

First Permanent Pacemaker Implantations in Burundi: A Case Series of three Patients in a Resource-Limited Setting

Macédoine Nijimbere[1,2*], François Nduwimana[1], Patrick Hakizimana[1], Clovis Paulin Baramburiye[1,2], Elysée Baransaka

[1]Surgery Department of Kamenge Teaching Hospital, Bujumbura, Burundi
[2]Cardiovascular Vascular Department of Tanganyika Hospital, Bujumbura, Burundi

DOI: https://doi.org/10.36347/sjmcr.2026.v14i07.026 | **Received:** 19.05.2026 | **Accepted:** 04.07.2026 | **Published:** 27.07.2026

***Corresponding author:** Macédoine Nijimbere
Surgery Department of Kamenge Teaching Hospital, Bujumbura, Burundi

Abstract **Case Report**

Access to permanent pacemaker implantation remains limited in many low-income countries despite its life-saving role in symptomatic bradyarrhythmias. We describe two cases of symptomatic bradyarrhythmia and one case of pacemaker generator replacement managed at Tanganyika Hospital, Burundi. Clinical presentations included complete atrioventricular block and paroxysmal bradycardia confirmed by ECG and Holter monitoring. Permanent pacemaker implantation was performed via transvenous subclavian access under fluoroscopic guidance. Active fixation leads were used for atrial and ventricular positioning. One patient required generator replacement due to battery depletion of a device implanted abroad. All procedures were successful without complications. Device interrogation confirmed appropriate function in all patients. Clinical symptoms resolved rapidly, and discharge occurred within 1–2 days. This case series highlights the feasibility and safety of establishing a local pacemaker implantation programme in a resource-limited setting.

Keywords: Pacemaker, Burundi, bradyarrhythmia, case series, resource-limited setting.

INTRODUCTION

Symptomatic bradyarrhythmias, particularly high-grade atrioventricular block and sick sinus syndrome, are life-threatening conditions requiring permanent cardiac pacing. In high-income countries, pacemaker implantation is a routine and highly effective intervention. However, access remains limited in many low-income settings due to financial, infrastructural, and technical constraints [1].

In Burundi, patients requiring permanent pacing have historically been referred abroad or left untreated, resulting in avoidable morbidity and mortality. The recent introduction of a local pacemaker implantation programme represents a major milestone in national cardiovascular care.

This article reports the first three cases of permanent pacemaker implantation performed locally in Burundi, highlighting feasibility, safety, and early clinical outcomes.

CASE PRESENTATION

Case 1

A 62-year-old man with a history of hypertension on medical therapy and insulin-dependent diabetes mellitus presented to Tanganyika Hospital with recurrent dizziness, presyncope, and exertional dyspnoea.

On examination, he was haemodynamically stable, obese, and comfortable at rest, with no clinical signs of heart failure. Cardiac auscultation revealed marked bradycardia. However, the initial 12-lead electrocardiogram was unremarkable, raising suspicion of intermittent bradyarrhythmia. Twenty-four-hour Holter monitoring subsequently confirmed paroxysmal bradycardia. Laboratory and imaging investigations were conducted to investigate the underlying aetiology, with no relevant abnormalities detected.

In view of symptom–rhythm correlation, an indication for permanent pacemaker implantation was established.

Right subclavian venous access was obtained under sterile conditions, and a subpectoral generator pocket was created. Atrial and right ventricular leads

were advanced under fluoroscopic guidance via introducer sheaths and positioned on the endocardial surfaces of the respective chambers. Satisfactory electrical parameters were achieved, with effective pacing set at 60 beats per minute.

Device function was confirmed intraoperatively using telemetry. The postoperative course was uneventful, and the patient was discharged the following day after final device interrogation confirmed stable pacemaker function.

Case 2

A 56-year-old man with a history of arterial hypertension presented to Tanganyika Hospital with dizziness and presyncope. Apart from hypertension, his medical history was unremarkable, with no known cardiac disease.

On physical examination, bradycardia was noted on palpation of peripheral pulses and cardiac auscultation. A 12-lead electrocardiogram revealed complete atrioventricular block with a junctional escape rhythm at 33 beats per minute.

Aetiological investigations, including laboratory and imaging studies, revealed no identifiable underlying cause. An indication for permanent pacemaker implantation was therefore established.

The right subclavian vein was used as the preferred access route. After creation of a subpectoral pocket beneath the pectoral fascia and placement of introducer sheaths, atrial and ventricular leads were positioned and secured on the endocardial surfaces of the respective cardiac chambers. The generator was then connected to the leads and implanted within the pocket.

Device interrogation via telemetry confirmed satisfactory pacemaker function. The patient was discharged the following day under antibiotic coverage, with instructions for regular follow-up.

Case 3

A 72-year-old man with a history of permanent pacemaker implantation in 2014 in Dubai, United Arab Emirates, presented with recurrent episodes of presyncope and dyspnoea.

On physical examination, the pacemaker generator was visible within its pocket. Bradycardia was noted on peripheral pulse examination. A 12-lead electrocardiogram demonstrated complete atrioventricular block with a ventricular rate of 30 beats per minute.

Chest radiography confirmed appropriate positioning of the atrial and ventricular leads. However, device interrogation failed to detect or communicate with the pacemaker generator, raising suspicion of generator depletion.

A diagnosis of pacemaker generator end-of-life was established, and a decision was made to proceed with generator replacement.

The previous incision was reopened, allowing exposure of the generator, which was disconnected from the leads and replaced with a new device. Appropriate pacing was immediately restored, with an electrically induced rhythm of 60 beats per minute.

Intraoperative device interrogation confirmed satisfactory pacemaker function. The patient was discharged the day following the procedure in stable condition.

Procedural Technique in details

All procedures were performed in the operating theatre under strict aseptic conditions and continuous electrocardiographic and haemodynamic monitoring. Written informed consent was obtained from all patients prior to the intervention. Prophylactic antibiotic therapy, consisting of intravenous ceftriaxone administered 30 minutes before skin incision, was routinely used.

The procedures were carried out under local anaesthesia with conscious sedation when required. Venous access was obtained percutaneously through the subclavian vein using the Seldinger technique. The right subclavian vein was the preferred access route in three patients, while the left subclavian vein was used in one patient.

Following venous access, a skin incision measuring approximately 4–5 cm was made inferior to the clavicle. A subpectoral pocket was then created beneath the pectoral fascia to accommodate the pulse generator. After insertion of introducer sheaths, transvenous pacing leads were advanced under fluoroscopic guidance into the cardiac chambers.

The atrial lead was positioned in the right atrial appendage, whereas the ventricular lead was placed at the right interventricular septum according to anatomical considerations and pacing parameters. Lead fixation was achieved using active fixation mechanisms.

Intraoperative measurements of pacing threshold, sensing amplitude, and lead impedance were systematically performed to ensure optimal electrical performance. Once satisfactory electrical parameters had been obtained, the leads were secured to the pectoral muscle fascia and connected to the pulse generator, which was subsequently implanted within the previously created pocket.

The generator pocket was irrigated with sterile saline solution, meticulous haemostasis was achieved,

and the wound was closed in layers using absorbable sutures for the subcutaneous tissues and non-absorbable sutures for skin closure. A sterile dressing was applied at the end of the procedure.

In the patient presenting with pacemaker battery depletion, generator replacement was performed through reopening of the previous incision. The depleted generator was disconnected from the existing leads, which were tested and found to be functioning appropriately. A new generator was subsequently connected to the pre-existing leads and implanted in the original pocket.

Device interrogation using a programmer was performed immediately after implantation in all patients to confirm appropriate sensing, pacing thresholds, and lead integrity. Chest radiography was routinely performed postoperatively to verify lead position and exclude procedure-related complications, including pneumothorax.

All patients were monitored for 24 hours after the procedure and were discharged the following day after repeat device interrogation confirmed satisfactory pacemaker function.

DISCUSSION

This case series represents the first documented experience of permanent pacemaker implantation in Burundi performed by Burundian physicians. The results demonstrate that safe and effective cardiac pacing can be achieved even in a resource-limited environment.

The clinical profiles of the patients are consistent with global patterns of pacing indications, where complete atrioventricular block remains the leading cause [2]. The absence of procedural complications in this series reflects careful patient selection, adequate operator training, and adherence to standard implantation protocols.

Beyond clinical success, this experience has major public health implications. It demonstrates that life-saving cardiovascular interventions can be decentralised to low-resource settings, reducing dependence on external referral systems. However, challenges remain, including device cost, long-term follow-up, and access to replacement therapy.

The implantation of pacemakers performed by a burundian physician clearly demonstrates that innovation in healthcare is a tangible reality and that the country is gradually aligning itself with international standards. Public authorities should influence, through health insurance policies and infrastructure development, the four key dimensions of access, namely geographical accessibility, availability of pacemakers, financial affordability, and acceptance of the therapy [1].

CONCLUSION

The first three cases of permanent pacemaker implantation in Burundi demonstrate clear feasibility, safety, and immediate clinical benefit. This pioneering experience marks an important step toward establishing sustainable cardiac electrophysiology services in the country.

Ethical Considerations: Informed consent was obtained from all patients. The study complied with institutional ethical standards.

Conflict of Interest: None declared.

Funding: No external funding was received.

REFERENCES

1. Jitendra Singh Makkar, Goran Milasinovic and Chi Keong Ching : Complementary role of governments, nongovernmental organizations, industry, and medical societies in expanding bradycardia therapy access. European Heart Journal Supplements (2023) 25 (Supplement H), H22–H26. The Heart of the Matter. https://doi.org/10.1093/eurheartjsupp/suad12
2. Khadidiatou Dia et al. Cardiac pacing: indications, modalities, complications, and challenges (results of a multicenter cross-sectional study in four hospitals in Dakar, Senegal). Pan African Medical Journal. 2024 ;49(14). 10.11604/pamj.2024.49.14.43515