Case Report

Infected Rastelli Conduit in an Immunocompromised Patient That Was Not Visible on Transthoracic Echocardiogram

Simon Parlow, MD, a Paul Beamish, MD, a Isabelle Desjardins, MD, a John Fulop, MD, b Gyaandeo Maharajh, MD, c and Lana Castellucci, MD, MSc d,e,f

a Department of Medicine, University of Ottawa, Ottawa, Ontario, Canada
b Division of Cardiology, Department of Medicine, University of Ottawa, Ottawa, Ontario, Canada
c Division of Pediatric Cardiac Surgery, Department of Surgery, University of Ottawa, Ottawa, Ontario, Canada
d Division of Hematology, Department of Medicine, University of Ottawa, Ottawa, Ontario, Canada
e School of Epidemiology and Public Health, University of Ottawa, Ontario, Canada
f Clinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, Ontario, Canada

ABSTRACT
An 18-year-old man with a history of right ventricle to pulmonary artery conduit implantation for repair of congenital heart disease and vasculitis requiring chronic immunosuppression with azathioprine presented to the University of Ottawa with bacteremia. A transthoracic echocardiogram revealed no abnormalities at the site of the conduit. A fludeoxyglucose positron emission tomography scan was subsequently obtained that demonstrated an infected right ventricle to pulmonary artery conduit. It is important to remember that, as is true for classic valve endocarditis, an unremarkable transthoracic echocardiogram does not rule out an infected conduit in this population, and nuclear imaging may have important diagnostic utility.

Case Description
An 18-year-old man presented to the University of Ottawa’s emergency department with a 4-day history of fevers, chills, and rigors. He had a history of congenital heart disease and was born with d-transposition of the great vessels (d-TGA), ventricular septal defect (VSD), and right ventricular outflow tract (RVOT) obstruction. On his first day of life, he underwent the Rastelli procedure, involving implantation of a right ventricular (RVOT) obstruction. On presentation, the patient was hypotensive, tachycardic, and febrile. He had normal neurological examination results.

RÉSUMÉ
Un homme de 18 ans, chez qui on avait implanté un conduit ventriculaire droit-artère pulmonaire (VD-AP) pour réparer une cardiopathie congénitale et qui avait des antécédents de vascularite nécessitant une immunosuppression continue par l’azathioprine, s’est présenté à l’hôpital affilié à l’Université d’Ottawa pour une bactériémie. Une échocardiographie transthoracique n’a révélé aucune anomalie au site du conduit. Elle a été suivie d’un examen de tomographie par émission de positrons (TEP) au fludeoxyglucose, qui a mis en évidence une infection du conduit VD-AP. Il est important de retenir que, comme dans le cas d’une endocardite valvulaire classique, un échocardiogramme transthoracique sans particularité ne permet pas d’exclure une infection de conduit dans cette population, et que l’imagerie nucléaire peut être d’une grande utilité diagnostique.

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Ethics Statement: The research reported in this article has adhered to all relevant ethical guidelines.

Corresponding author: Dr Simon Parlow, Department of Medicine, University of Ottawa, 737 Parkdale Ave, Ottawa, Ontario K1Y 4E9, Canada.
E-mail: sparlow@oh.ca
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in long-axis view (Fig. 1). On day 5 of admission, computed
tomography scans of his head, abdomen, and pelvis were
obtained and did not reveal any source of infection. Repeat
blood cultures were persistently positive, and because suspi-
cion for endocarditis remained high, he was referred for a
fluodeoxyglucose positron emission tomography (FDG-PET)
scan. This test was chosen instead of transesophageal echo-
cardiography (TEE) because the team believed it would be of
higher diagnostic yield given his complex cardiac anatomy.
The FDG-PET scan showed signifi-
cant radiotracer uptake at
the site of the RV-PA conduit, consistent with active conduit
infection (Fig. 2).

After 9 weeks of intravenous antibiotics, most of which
were given in the inpatient setting, he was taken electively to
the operating room for replacement of his RV-PA conduit. He
was discharged to his home in stable condition after a brief
admission to the cardiac surgery intensive care unit.

Discussion

The Rastelli procedure was initially described by Rastelli
and colleagues in 1969 and remains the procedure of choice
for surgical repair of d-TGA associated with VSD and RVOT
obstruction. It involves baffling of the VSD to the aorta and
bypass of the RVOT using an extracardiac conduit. IE after a
Rastelli operation is rare. Morris et al. followed a population-
based registry of all patients in the state of Oregon who had
congenital heart disease that was surgically repaired from
1958 to 1998, and cumulative incidence of IE at 20 years
after surgery in all patients with surgically repaired d-TGA
was 4%.

Although TEE plays an important role in the diagnosis of
IE and is recommended by the American Heart Association
and American College of Cardiology in patients who have
persistently positive blood cultures despite negative TTE re-
sults, nuclear medicine technology (NMT) remains an
important alternative diagnostic tool for clinicians to consider
in this case. NMT can aid in the diagnosis of IE when
echocardiography is inconclusive and has been shown to have
high sensitivity for detecting IE in the setting of congenital
heart disease. In a recent meta-analysis, FDG-PET improved
the diagnostic sensitivity of prosthetic valve IE to greater than
80% when used as an adjunct to echocardiography, and in a
cohort of 39 patients with suspected infected cardiac pro-
thesis despite an inconclusive TEE, FDG-PET definitively
diagnosed 14 patients. In addition, recent data have led the
European Society of Cardiology to recommend the use of
PET imaging in the diagnosis of prosthetic valve endocardi-
tis. However, it should be noted that the diagnostic sensi-
tivity of NMT can be affected by the adequate preparation of
the patient before the image is acquired and the methodology
used for image interpretation, and currently no guidelines
exist outlining criteria for either of these 2 factors.

Conclusion

To our knowledge, we present the first case report of a
patient with previous RV-PA conduit placement who was
immunosuppressed and subsequently developed IE. His
diagnosis was eventually confirmed using NMT. As is true for
valvular endocarditis, a negative TTE should never be used to
definitively rule out infection of an implanted conduit, and
further diagnostic modalities such as TEE may be necessary to
confirm the diagnosis. NMT also should be considered as a
method of improving diagnostic sensitivity in this population
by improving sensitivity of echocardiography alone.

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of Medicine for its support in the preparation of this case
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Figure 1. Transthoracic echocardiogram showing the right ventricular to pulmonary artery (RV-PA) conduit without (L) and with (R) colour Doppler
flow displaying no identifiable vegetation.
Disclosures
The authors have no disclosures to declare.

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