

# World Journal of *Clinical Cases*

*World J Clin Cases* 2023 November 26; 11(33): 7940-8093



## Contents

Thrice Monthly Volume 11 Number 33 November 26, 2023

## EDITORIAL

- 7940 Glimpse into the future of prosthodontics: The synergy of artificial intelligence  
*Heboyang A, Yazdanie N, Ahmed N*

## MINIREVIEWS

- 7943 Application progress of nursing intervention in cardiac surgery  
*Wang SR, Zhou K, Zhang W*

## ORIGINAL ARTICLE

## Retrospective Cohort Study

- 7951 Comparison between multiple logistic regression and machine learning methods in prediction of abnormal thallium scans in type 2 diabetes  
*Yang CC, Peng CH, Huang LY, Chen FY, Kuo CH, Wu CZ, Hsia TL, Lin CY*

## Retrospective Study

- 7965 Fever glove hand-shake method safe blood collection from children's fingertips in COVID-19 fever clinic  
*Luo L, Qin WL, Huang HM, Ou ZH, Peng ZH*
- 7972 Influence of ganglioside combined with methylprednisolone sodium succinate on efficacy and neurological function in patients with acute myelitis  
*Sun YF, Liu LL, Jiang SS, Zhang XJ, Liu FJ, Zhang WM*
- 7980 Treatment of postpartum depression with integrated traditional Chinese and Western medicine nursing and electrical stimulation  
*Zhai WH, Wang MJ, Zhao YJ, Hu SL, Zhou JM*
- 7987 Prolonged impacts of COVID-19-associated cystitis: A study on long-term consequences  
*Wittenberg S, Vercnocke J, Chancellor M, Dhar S, Liaw A, Lucas S, Dhar N*
- 7994 Comparative analysis of conventional ultrasound and shear wave elastography features in primary breast diffuse large B-cell lymphoma  
*Zhang XD, Zhang K*
- 8003 Artificial dermis combined with skin grafting for the treatment of hand skin and soft tissue defects and exposure of bone and tendon  
*Wang W, Chen DS, Guo ZD, Yu D, Cao Q, Zhu XW*
- Observational Study
- 8013 Subcutaneous fat thickness and abdominal depth are risk factors for surgical site infection after gastric cancer surgery  
*Yu KY, Kuang RK, Wu PP, Qiang GH*

## CASE REPORT

- 8022** Pathological diagnosis and immunohistochemical analysis of minute pulmonary meningotheelial-like nodules: A case report  
*Ruan X, Wu LS, Fan ZY, Liu Q, Yan J, Li XQ*
- 8030** Giant complex hepatic cyst causing pseudocystitis: A case report  
*Li S, Tang J, Ni DS, Xia AD, Chen GL*
- 8038** Carotid-subclavian bypass and endovascular aortic repair of Kommerell's diverticulum with aberrant left subclavian artery: A case report  
*Akili W, Feng Y, Zhang XX, Li SL, Ma XT, Hu M, Cheng C*
- 8044** Granular cell tumor of the breast: A case report and review of literature  
*Yan J*
- 8050** Fibula allograft transplantation combined with locking plate for treatment of recurrent monostotic fibular fibrous dysplasia: A case report  
*Xie LL, Yuan X, Zhu HX, Fu L, Pu D*
- 8058** Asian variant intravascular large B-cell lymphoma with highly suspected central nervous system involvement: A case report  
*Lee YP, Son SM, Kwon J*
- 8065** Treatment of adult congenital anal atresia with rectovestibular fistula: A rare case report  
*Wang J, Zhang XY, Chen JH, Jin HY*
- 8071** Cerebral proliferative angiopathy in pediatric age presenting as neurological disorders: A case report  
*Luo FR, Zhou Y, Wang Z, Liu QY*
- 8078** Hepatocellular carcinoma presenting as organized liver abscess: A case report  
*Ryou SH, Shin HD, Kim SB*
- 8084** Generalized granuloma annulare in an infant clinically manifested as papules and atrophic macules: A case report  
*Zhang DY, Zhang L, Yang QY, Li J, Jiang HC, Xie YC, Shu H*
- 8089** Successful leadless pacemaker implantation in a patient with dextroversion of the heart: A case report  
*Li N, Wang HX, Sun YH, Shu Y*

**ABOUT COVER**

Editorial Board Member of *World Journal of Clinical Cases*, Vicky Panduro-Correa, DSc, FACS, MD, MSc, Professor, Surgeon, Department of Surgery, Hospital Regional Hermilio Valdizán, Huanuco 10000, Peru.  
vpanduro@unheval.edu.pe

**AIMS AND SCOPE**

The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

**INDEXING/ABSTRACTING**

The WJCC is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2023 Edition of Journal Citation Reports® cites the 2022 impact factor (IF) for WJCC as 1.1; IF without journal self cites: 1.1; 5-year IF: 1.3; Journal Citation Indicator: 0.26; Ranking: 133 among 167 journals in medicine, general and internal; and Quartile category: Q4.

**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: Zi-Hang Xu, Production Department Director: Xiang Li, Editorial Office Director: Jin-Lai Wang.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Bao-Gan Peng, Salim Surani, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati

**EDITORIAL BOARD MEMBERS**

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

November 26, 2023

**COPYRIGHT**

© 2023 Baishideng Publishing Group Inc

**INSTRUCTIONS TO AUTHORS**

<https://www.wjgnet.com/bpg/gerinfo/204>

**GUIDELINES FOR ETHICS DOCUMENTS**

<https://www.wjgnet.com/bpg/GerInfo/287>

**GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH**

<https://www.wjgnet.com/bpg/gerinfo/240>

**PUBLICATION ETHICS**

<https://www.wjgnet.com/bpg/GerInfo/288>

**PUBLICATION MISCONDUCT**

<https://www.wjgnet.com/bpg/gerinfo/208>

**ARTICLE PROCESSING CHARGE**

<https://www.wjgnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

<https://www.wjgnet.com/bpg/GerInfo/239>

**ONLINE SUBMISSION**

<https://www.f6publishing.com>



## Successful leadless pacemaker implantation in a patient with dextroversion of the heart: A case report

Na Li, Hai-Xiong Wang, Yue-Hui Sun, Yan Shu

**Specialty type:** Cardiac and cardiovascular systems

**Provenance and peer review:** Unsolicited article; Externally peer reviewed.

**Peer-review model:** Single blind

**Peer-review report's scientific quality classification**

Grade A (Excellent): 0  
Grade B (Very good): B  
Grade C (Good): 0  
Grade D (Fair): 0  
Grade E (Poor): 0

**P-Reviewer:** Sutton R, United Kingdom

**Received:** September 19, 2023

**Peer-review started:** September 19, 2023

**First decision:** October 17, 2023

**Revised:** October 22, 2023

**Accepted:** November 14, 2023

**Article in press:** November 14, 2023

**Published online:** November 26, 2023



Na Li, Hai-Xiong Wang, Yue-Hui Sun, Yan Shu, Department of Cardiology, Shanxi Cardiovascular Hospital, Taiyuan 030000, Shanxi Province, China

**Corresponding author:** Yan Shu, Doctor, PhD, Chief Pharmacist, Department of Cardiology, Shanxi Cardiovascular Hospital, No. 18 Yifen Street, Taiyuan 030000, Shanxi Province, China. [shuyan20230919@163.com](mailto:shuyan20230919@163.com)

### Abstract

#### BACKGROUND

Dextroversion is defined as the presence of dextrocardia with situs solitus, dextro-loop ventricles, and normally related great arteries. Dextrocardia can pose technical challenges when interventional treatments are required. However, the challenges posed by dextroversion can be amplified due to the disruption of typical anatomical relationships, the unpredictable positioning and boundaries of cardiac structures resulting from the shift, and the pathological processes influencing rotation.

#### CASE SUMMARY

A 73-year-old woman with cardiac dextroversion suffered from a recurrence of atrial fibrillation after her radiofrequency catheter ablation and Despite the cessation of antiarrhythmic medications, there were episodes of sinus pauses and symptomatic bradycardia, with heart rates dropping as low as 28 beats per minute.

#### CONCLUSION

Dextroversion makes the implantation of leadless pacemakers more challenging, and appropriate adjustments in fluoroscope angles may be crucial for intracardiac operations. Additionally, when advancing delivery systems, attention should be paid to rotational direction during valve-crossing procedures; changes in the perspective of posture angle between normal cardiac position and dextroversion can serve as references.

**Key Words:** Leadless pacemaker; Dextroversion; Pacemaker implantation; Case report

©The Author(s) 2023. Published by Baishideng Publishing Group Inc. All rights reserved.



**Core Tip:** Dextroversion can be even more challenging given the distortion of normal anatomical relationships and the uncertainty of the accurate location and borders of the cardiac structures caused by the shift and rotation effected by the pathologic process. We present a complicated but successful case of implantation of a leadless pacemaker in a patient with cardiac dextroversion.

**Citation:** Li N, Wang HX, Sun YH, Shu Y. Successful leadless pacemaker implantation in a patient with dextroversion of the heart: A case report. *World J Clin Cases* 2023; 11(33): 8089-8093

**URL:** <https://www.wjgnet.com/2307-8960/full/v11/i33/8089.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v11.i33.8089>

## INTRODUCTION

Abnormal heart structures complicate cardiac electrophysiology operative treatment, especially the implantation of devices like leadless pacemakers. It is primarily because the tools provided by manufacturers have not been sufficiently designed or tested for rare abnormal structures. Thus, implementing these delivery systems in intricately structured cases can be demanding or necessitate a level of innovation. The literature presents scarce accounts concerning the installation of leadless pacemakers in patients having dextrocardia[1-3]. Dextrocardia, a scarcely occurring inborn anomaly in the general population, is estimated to occur in 1 out of every 12000 live births, and it might be linked with substantial supplementary cardiac deformities[4]. The incidence of dextrocardia is evenly distributed between males and females at a ratio of 1:1. In cases of dextrocardia, the positioning of abdominal organs may be normal (situs solitus), reversed (situs inversus), or indeterminate (situs ambiguous or isomerism) in respective proportions of 32%-35%, 35%-39%, and 26%-28%[4,5]. Dextroversion is characterized by a right-sided cardiac placement with a rightward cardiac apex in the context of situs solitus. Unlike situs inversus, where the arrangement of the viscerotrial mirrors the typical layout, dextroversion features the conventional positioning of the tracheobronchial tree and abdominal organs[6].

The hominine embryonic heart originates from a rudimentary cardiac tube that has the sinus venosus, atrium, ventricle, bulbus cordis, and arterial trunks lined up in sequence. The end of veins and arteries are stationary. The atriums and veins return develop concurrently, thus anchoring the atria in place *via* the inflowing veins. The growth of the bulboventricular loop causes the cardiac tube to bend, creating morphological-biventricular chamber. This process does not impact position of the atria, which continues to correspond with the location of the internal organs[7,8]. During the initial phases of fetal development, situs solitus and the establishment of the dextro-loop take place, positioning the heart's apex within the right hemithorax. In the initial four weeks of the newborn's lifetime, the tip of heart transitions from the right thoracic cavity to the left half of the chest. Despite of the auricular position, every dextro-bulboventricular loop ought to complete their advancement with the heart in the left half of the chest.

Dextroversion can be congenital as well as acquired. The former is due to defeat of the ultimate leftward shift of biventricular chambers during the process of embryogenesis. Although the morphologic right atrium and right ventricle are still located on the right side, they are positioned behind the corresponding left atrium. In this case, the right rotation of the heart was caused by mechanical morphological compression of the left diaphragm due to obvious elevation, which was considered to be related to phrenic nerve palsy after previous radiofrequency catheter ablation. Owing to the fact that the apex is towards the right with situs solitus, the cardiac shift in the thoracic cavity to the right causes changes in venal junctions and also alters the dissecting associations among each vessel, the right heart system. This distortion, coupled with the variations among patients, makes it highly demanding to implement procedures of the heart. Furthermore, literatures provide scant reports on operation of leadless pacemaker in sufferers who have dextrocardia[2,3,9]. At present, this is the first case of leadless pacemaker implantation in a patient with dextroversion of the heart.

## CASE PRESENTATION

### Chief complaints

A 73-year-old woman was suffered from sinus pauses and symptomatic bradycardia (as low as 28 beats per minute) even after the cessation of antiarrhythmic drugs.

### History of present illness

The patient experienced a relapse of atrial fibrillation and subsequently arrived at an external hospital exhibiting episodes of sinus pauses and symptomatic bradycardia (down to 28 beats per minute), even after ceasing the use of antiarrhythmic drugs.

### History of past illness

The patient had a history of transient ischemic attack and severely symptomatic paroxysmal atrial fibrillation for 20 years with a history of radiofrequency catheter ablation and left atrial appendage closure in 2019. Initially, the left atrial appendage was occluded, succeeded by the implementation of pulmonary vein isolation (PVI). The placement of the

Watchman device was successfully affirmed with no remaining flow. Subsequently, PVI was executed utilizing radiofrequency ablation. The blockage of both ingress and egress was substantiated in all veins]. And she suffered from dextroversion, which was proved by chest X-ray and Echocardiography.

### **Personal and family history**

This case had no specific personal or family history.

### **Physical examination**

No abnormalities were detected in the physical examination.

### **Laboratory examinations**

All laboratory tests were normal.

### **Imaging examinations**

A chest X-ray verified the presence of a cardiac shadow on the right side, with the apex of the heart orientated towards the right. However, there was no evidence of an expanded cardiac silhouette. The mediastinum was centrally positioned, with the liver's shadow on the right aligning with situs solitus. Furthermore, the left hemidiaphragm displayed at a level higher than its right counterpart. Echocardiography indicated a dextro-loop configuration in ventricular morphology, accompanied by a right-oriented cardiac axis and a ventricular apex directed towards the right.

---

## **FINAL DIAGNOSIS**

The patient had a history of transient ischemic attack and severely symptomatic paroxysmal atrial fibrillation for 20 years with a history of radiofrequency catheter ablation and left atrial appendage closure in 2019. Then she experienced a relapse of atrial fibrillation and had episodes of sinus pauses and symptomatic bradycardia (down to 28 beats per minute), even after ceasing the use of antiarrhythmic drugs.

---

## **TREATMENT**

Right femoral venous access was secured under fluoroscopic guidance using a micro-puncture needle. A lengthy Amplatz stiff guidewire was threaded and pushed forward through the micro-puncture sheath, in anticipation of the Micra implantation. Fluoroscopic assessment of the guidewire in the thoracic area revealed the cordis image in the right half of chest (Figure 1A). Owing to the dextroversion, a quadripolar lead wire (F5QD252RT, Biosense Webster, CA, United States) was advanced to the heart to seek an optimal exposure angle (Figure 1B and C). Then, the right anterior oblique view of 45° and left anterior oblique view of 15° were applied by the electrophysiologist to give assistance in order to be more safer and precise in placement of the Medtronic Micra leadless pacemaker. Under fluoroscopic guidance, the pacemaker introducer sheath and delivery system were respectively positioned in the right atrium and right ventricle. Concurrently, the Micra was embedded in the right ventricle septum (Figure 2). Once the stability and electrical thresholds were confirmed, the Micra was released from the catheter. The pacemaker was functioning properly, and its R wave is 8.0 mV, impedance is 840 ohms, and capture threshold is 0.8 V @0.24 ms.

---

## **OUTCOME AND FOLLOW-UP**

In the instance, no prolonged complications were noted. The device function was appropriate at 3 mo, 6 mo and 12 mo following Micra leadless pacemaker placement.

---

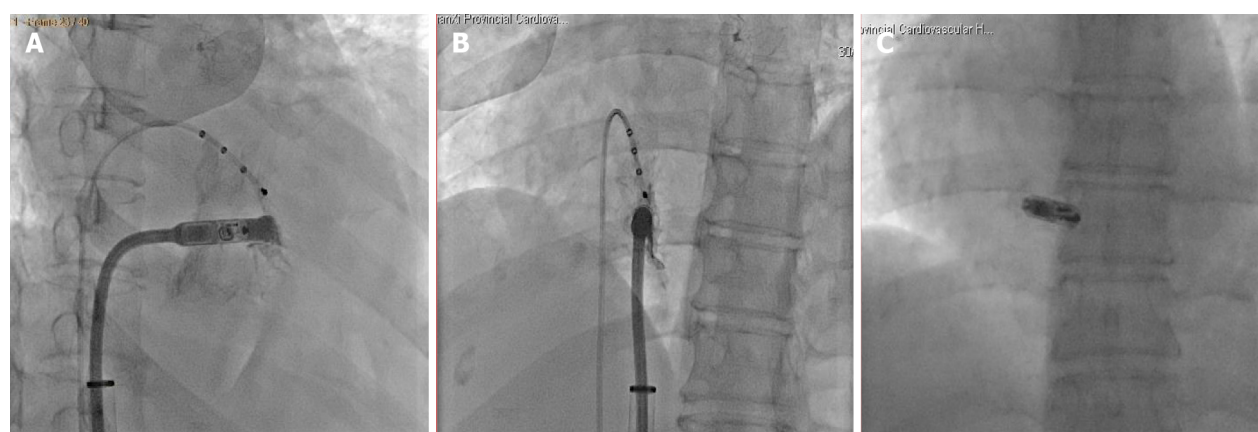
## **DISCUSSION**

In the conventional position of the heart, we usually use a right anterior oblique 30° and left anterior oblique 45° to determine the relative position between the delivery system and leadless pacemaker with the interventricular septum. However, due to the dextroversion in this patient, the fluoroscope angle needed to be adjusted accordingly based on anatomical distortion. In this case, a reference was made by placing a quadripolar lead wire in the right ventricular for pre-operation. This helped determine the optimal angle for exposing the delivery system and interventricular septum, which was a right anterior oblique 45° and left anterior oblique 15°. When crossing over the tricuspid valve, an additional counterclockwise rotation angle was required; while after the crossing-over, there was relatively less clockwise rotation compared to when in a normal cardiac position. Owing to the relatively sharp angular torque compared to conventional anatomical structures and the correspondingly reduced coaxiality generated in the delivery system rooting in the complicated anatomical structure, the severed tethers were discovered to be tight. Thus, utmost caution needed to be taken in removing the tethers in order to avoid negative impacts on pacemaker fixation during the release process.



DOI: 10.12998/wjcc.v11.i33.8089 Copyright ©The Author(s) 2023.

**Figure 1** Fluoroscopy location and optimal exposure angles for treatment. A: The Amplatz stiff guidewire in the right hemithorax, demonstrating the right-sided position of the heart; B: Quadripolar lead wire, left anterior oblique view of 15°; C: Quadripolar lead wire, right anterior oblique view of 45°.



DOI: 10.12998/wjcc.v11.i33.8089 Copyright ©The Author(s) 2023.

**Figure 2** Fluoroscopy. Implantation of Micra. A: Micra (Medtronic Inc., Minneapolis, MN, United States) sheath injection and septal staining with contrast injection of the right anterior oblique view of 45°; B: Micra sheath injection and septal staining with contrast injection of left anterior oblique view of 15°; C: Zoomed-in anteroposterior view.

## CONCLUSION

Dextroversion makes the implantation of leadless pacemakers more challenging, and appropriate adjustments in fluoroscope angles may be crucial for intracardiac operations. Additionally, when advancing delivery systems, attention should be paid to rotational direction during valve-crossing procedures; changes in the perspective of posture angle between normal cardiac position and dextroversion can serve as references. This case study reports the successful implantation of a leadless pacemaker in a patient with dextroversion and provides invaluable clinical experience for the development of a relevant therapeutic regimen.

## FOOTNOTES

**Co-first authors:** Na Li and Yue-Hui Sun.

**Co-corresponding authors:** Yan Shu and Hai-Xiong Wang.

**Author contributions:** Shu Y and Wang HX made an equal contribution to this work, and were responsible for the design of the research study; Li N and Sun YH analyzed the data and wrote the manuscript; Every author has reviewed and given their approval to the final draft of the manuscript.

**Supported by** Shanxi Provincial Health Commission “Four batch” Science and Technology Innovation Project of Medical Development, No. 2021XM45; Natural Science Foundation of Shanxi Province, No. 20210302123346; Scientific Research Incentive Fund of Shanxi Cardiovascular Hospital, No. XYS20220205; and Traditional Chinese Medicine research project of Shanxi Province, No. 2023ZYA028.



**Informed consent statement:** All study participants, or their legal guardian, provided informed written consent prior to study enrollment.

**Conflict-of-interest statement:** All the authors have no conflicts of interest to declare.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

**Country/Territory of origin:** China

**ORCID number:** Na Li 0000-0003-4213-0463; Hai-Xiong Wang 0000-0001-9905-7899; Yue-Hui Sun 0009-0006-6748-9674; Yan Shu 0009-0008-3727-049X.

**S-Editor:** Liu JH

**L-Editor:** A

**P-Editor:** Liu JH

## REFERENCES

- 1 Buxton AE, Morganroth J, Josephson ME, Perloff JK, Shelburne JC. Isolated dextroversion of the heart with asymmetric septal hypertrophy. *Am Heart J* 1976; **92**: 785-790 [PMID: 136888 DOI: 10.1016/S0002-8703(76)80017-8]
- 2 Shenthar J, Rai MK, Walia R, Ghanta S, Sreekumar P, Reddy SS. Transvenous permanent pacemaker implantation in dextrocardia: technique, challenges, outcome, and a brief review of literature. *Europace* 2014; **16**: 1327-1333 [PMID: 24591676 DOI: 10.1093/europace/euu024]
- 3 De Regibus V, Pardeo A, Artale P, Petretta A, Filannino P, Iacopino S. Leadless pacemaker implantation after transcatheter lead extraction in complex anatomy patient. *Clin Case Rep* 2018; **6**: 1106-1108 [PMID: 29881575 DOI: 10.1002/ccr3.1532]
- 4 Bohun CM, Potts JE, Casey BM, Sandor GG. A population-based study of cardiac malformations and outcomes associated with dextrocardia. *Am J Cardiol* 2007; **100**: 305-309 [PMID: 17631088 DOI: 10.1016/j.amjcard.2007.02.095]
- 5 Garg N, Agarwal BL, Modi N, Radhakrishnan S, Sinha N. Dextrocardia: an analysis of cardiac structures in 125 patients. *Int J Cardiol* 2003; **88**: 143-55; discussion 155 [PMID: 12714192 DOI: 10.1016/s0167-5273(02)00539-9]
- 6 Tripathi S, Ajit Kumar VK. Comparison of Morphologic Findings in Patients with Dextrocardia with Situs Solitus vs Situs Inversus: a Retrospective Study. *Pediatr Cardiol* 2019; **40**: 302-309 [PMID: 30334087 DOI: 10.1007/s00246-018-2007-4]
- 7 Vanpraagh R, Vanpraagh S, Vlad P, Keith JD. Anatomic types of congenital dextrocardia: Diagnostic and embryologic implications. *Am J Cardiol* 1964; **13**: 510-531 [PMID: 14136294 DOI: 10.1016/0002-9149(64)90159-6]
- 8 Applegate KE, Goske MJ, Pierce G, Murphy D. Situs revisited: imaging of the heterotaxy syndrome. *Radiographics* 1999; **19**: 837-52; discussion 853 [PMID: 10464794 DOI: 10.1148/radiographics.19.4.g99jl31837]
- 9 Conti S, Sgarito G. Leadless pacemaker implantation in postpneumonectomy syndrome. *HeartRhythm Case Rep* 2020; **6**: 124-125 [PMID: 32181128 DOI: 10.1016/j.hrcr.2019.11.005]



Published by **Baishideng Publishing Group Inc**  
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)

**Help Desk:** <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

