Eletrocardiograma estranho.

Lamentavelmente sem dados clínicos: Qual o diagnóstico?

Strange electrocardiogram. Unfortunately no clinical data: What is the diagnosis?

Extraño electrocardiograma.Lamentablemente no hay datos clínicos: ¿Cuál es el diagnóstico?

ECG Courtesy from Dr Marcelo Garcia Leal MD

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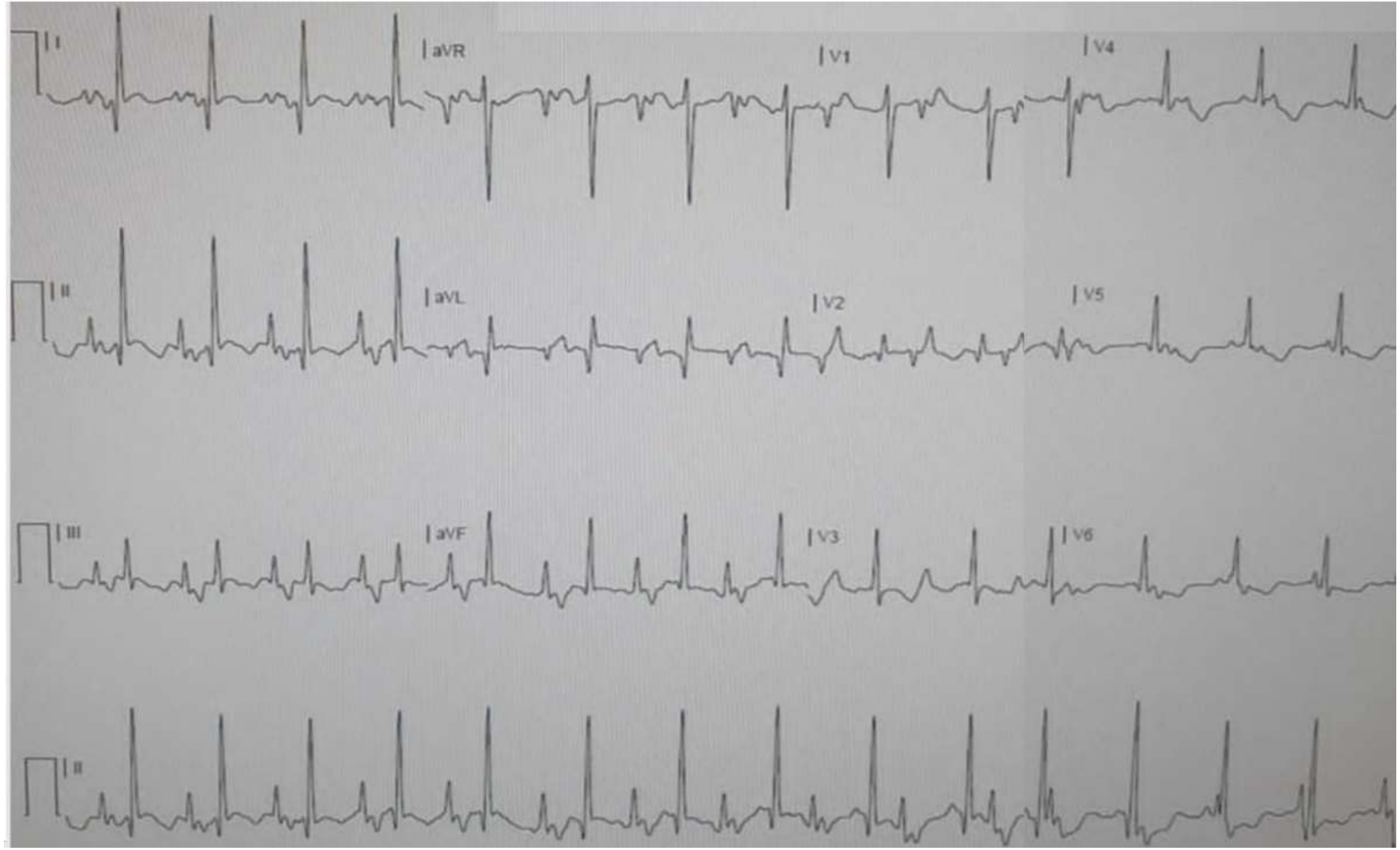


This ECG is from an individual undergoing heterotopic heart transplantation, who does not remain the native heart that is linked in parallel to the donor's heart. There are, therefore, two QRS alternating. Note that the QRS of the native heart is different and alternates one with another Heterotopic heart transplantation (HHT) is a surgical procedure that allows the graft to be connected to the native heart in a parallel fashion. The main advantage of HHT is to assist the patient's native heart and to maintain circulation in the cases of severe acute rejection.

Theoretical considerations

Prof. Dr Andrés Ricardo **Pérez-Riera, MD PhD**

Medical Clinic and its specialties

Uninove - Universidade Nove de Julho - Campus Mauá

My cardiology websites of scientific interest:

https://ekgvcg.wordpress.com/

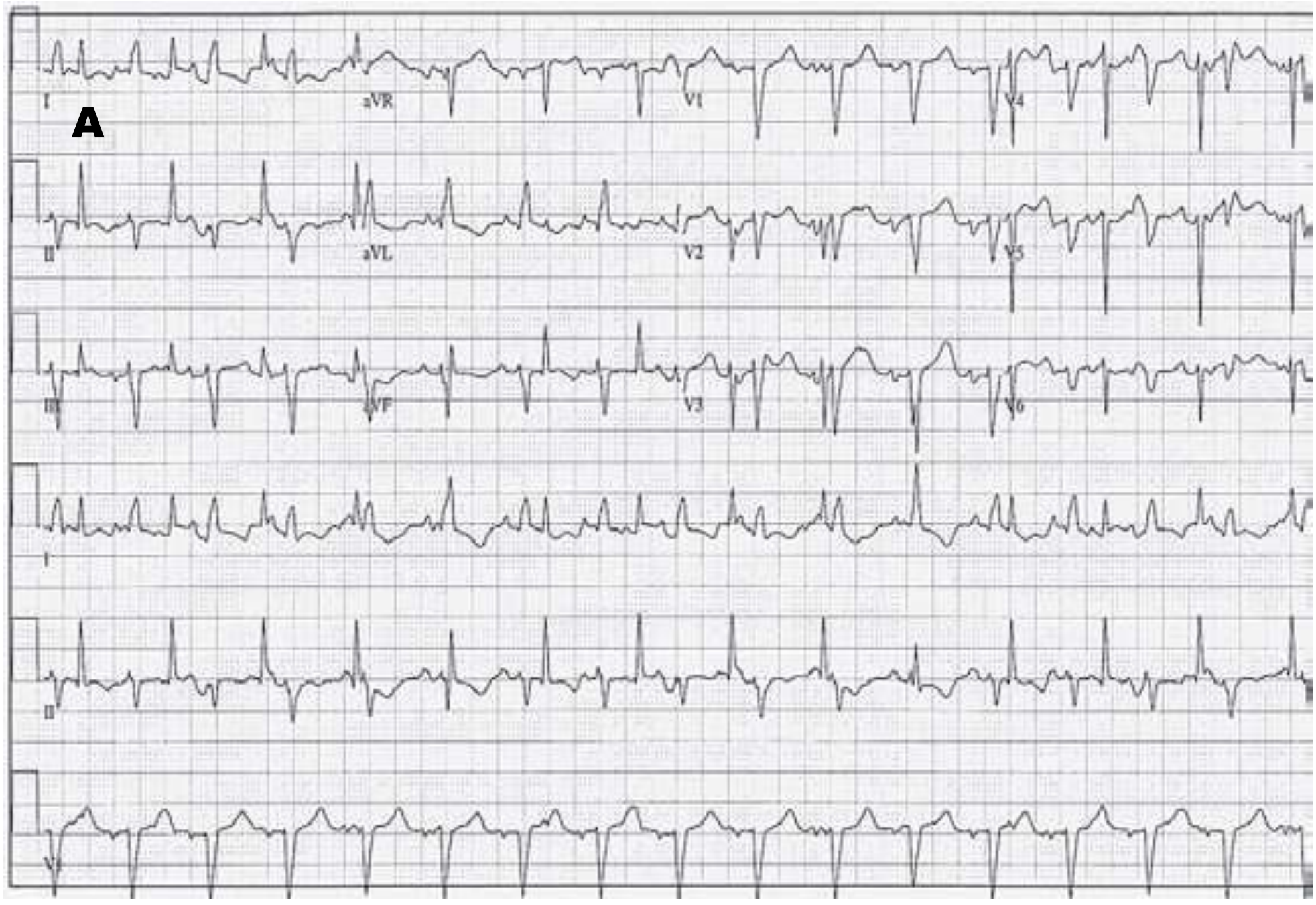
https://cardiacademy.com/

CV Lattes: http://buscatextual.cnpq.br/buscatextual/visualizacv.do?id=K4244824E7

Another similar literature example /Otro caso similar de la literatura

A 64-year-old man presented with progressive shortness of breath and exercise intolerance due to end-stage ischemic cardiomyopathy. Since he remained severely symptomatic despite maximal medical therapy, he underwent a heterotopic cardiac transplantation. Because of the presence of severe pulmonary hypertension, the recipient's native heart (N) was left in place and the allograft was implanted in the right chest. The native heart maintains right circulation in spite of chronic pulmonary hypertension, while the heterotopic donor heart (D) functions as a biologic left ventricular assist device. The post-transplantation electrocardiogram shows two QRS complexes with different axes (Panel A).The allograft can be seen clearly in the right chest on both the radiograph (Panel B) and the computed tomographic scan (Panel C) of the chest. An automatic implantable cardiac defibrillator and cardiac medications are used to treat the recipient's native heart, as are immunosuppressive medications for the allograft.

Hombre de 64 años se presentó con disnea progresiva e intolerancia al ejercicio debido a una miocardiopatía isquémica terminal (NYHA IV). Dado que permaneció severamente sintomático a pesar de la terapia farmacológica optimizada, se sometió a un trasplante cardíaco heterotópico. Debido a la presencia de hipertensión pulmonar severa, se dejó en su lugar el corazón nativo (N) del receptor y se implantó un aloinjerto en el tórax derecho. El corazón nativo mantiene la circulación correcta a pesar de la hipertensión pulmonar crónica, mientras que el del donante heterotópico (D) funciona como un dispositivo biológico de asistencia del ventrículo izquierdo. El electrocardiograma posterior al trasplante muestra dos complejos QRS con ejes diferentes (Panel A). El aloinjerto se puede ver claramente en el tórax derecho tanto en la radiografía (Panel B) como en la tomografía computarizada (Panel C) del tórax. Se utilizan un desfibrilador cardíaco automático implantable y fármacos para tratar el corazón nativo del receptor, al igual que medicamentos inmunosupresores para el aloinjerto.


A
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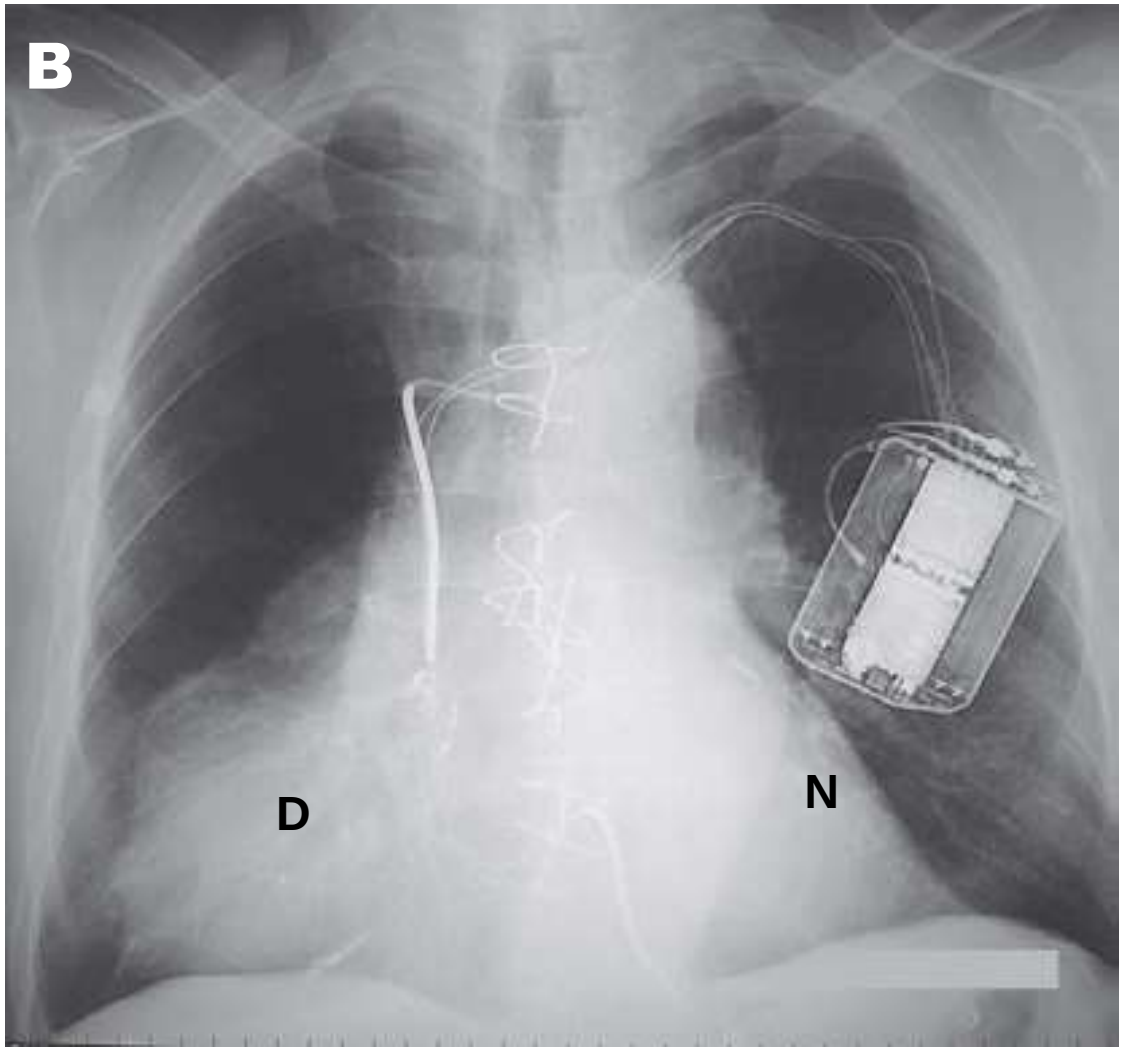
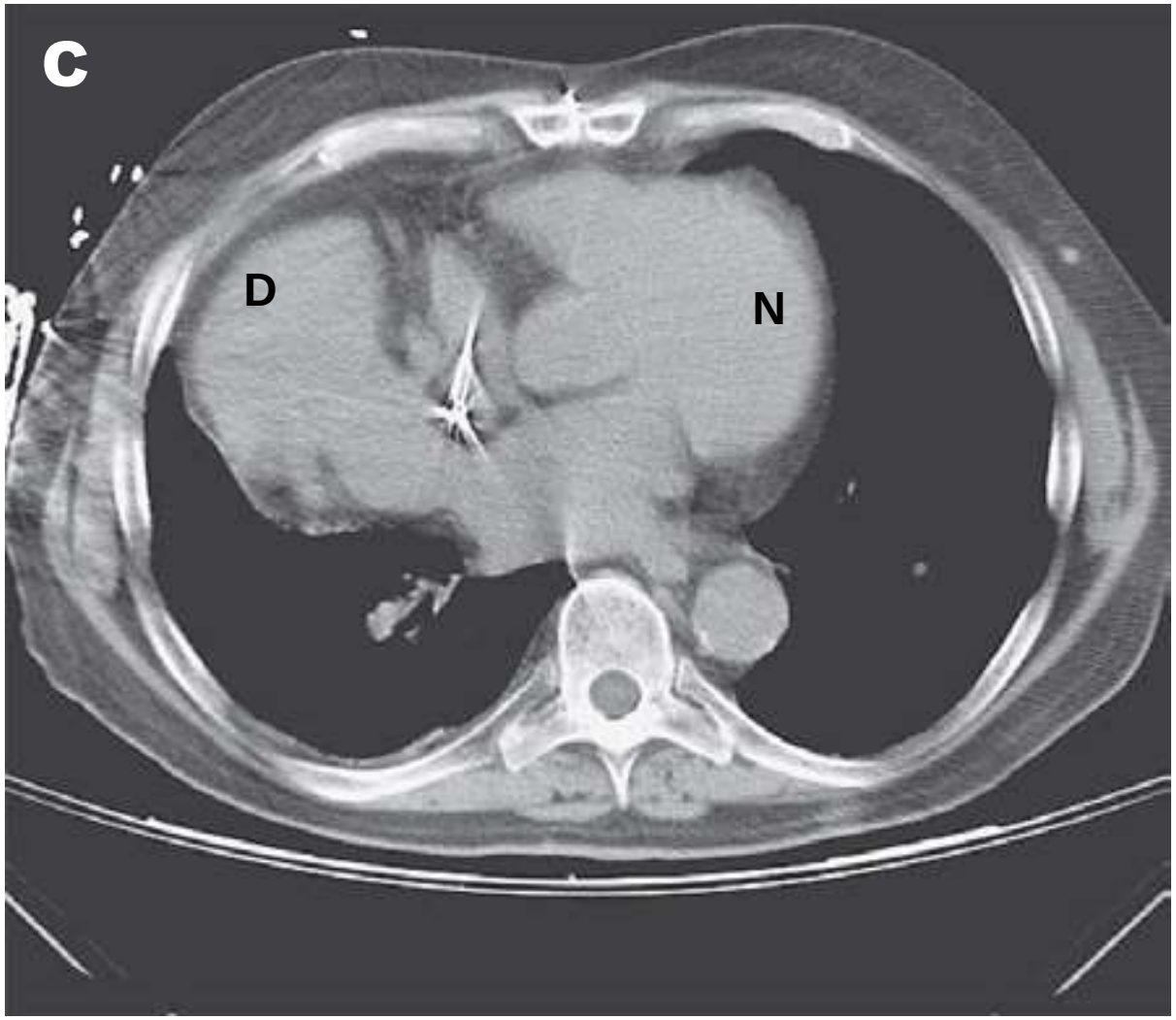




Ghany RA, de Marchena E. Images in clinical medicine. Two hearts. N Engl J Med. 2007 Feb 15;356(7):e6.

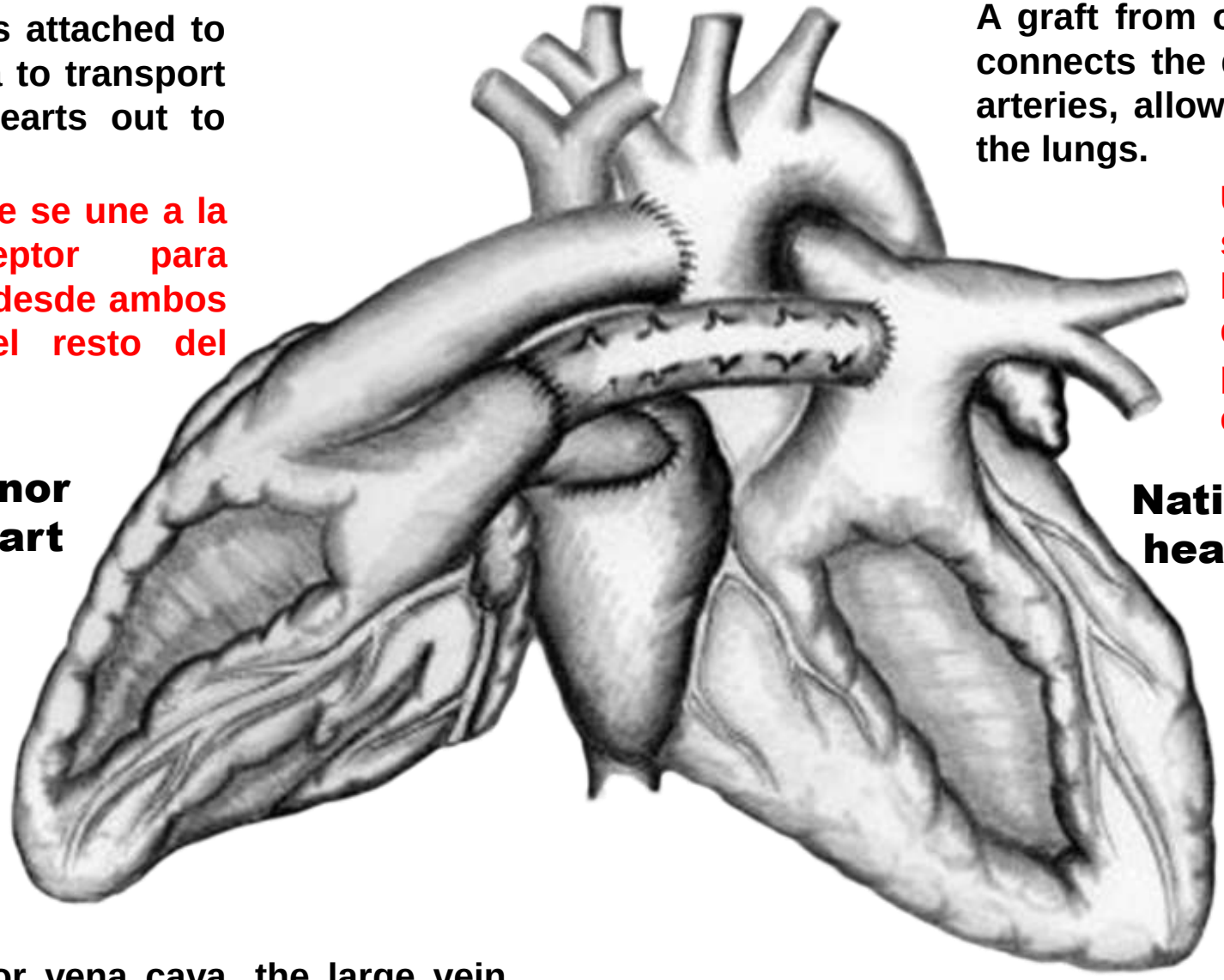
How surgeons connect two hearts / Como cirujanos conectan dos corazones

The donor's aorta is attached to the recipient's aorta to transport blood from both hearts out to the body

La aorta del donante se une a la aorta del receptor para transportar sangre desde ambos corazones hacia el resto del cuerpo.

A graft from one of the donor's blood vessels connects the donors and recipients pulmonary arteries, allowing both hearts to send blood to the lungs.

Un injerto de uno de los vasos sanguíneos del donante conecta las arterias pulmonares del donante y del receptor, lo que permite que ambos corazones envíen sangre a los pulmones



The donor's superior vena cava, the large vein that carries blood from the head, neck and arms is attached to the recipient's right atrium so that blood from the body now flows to both hearts

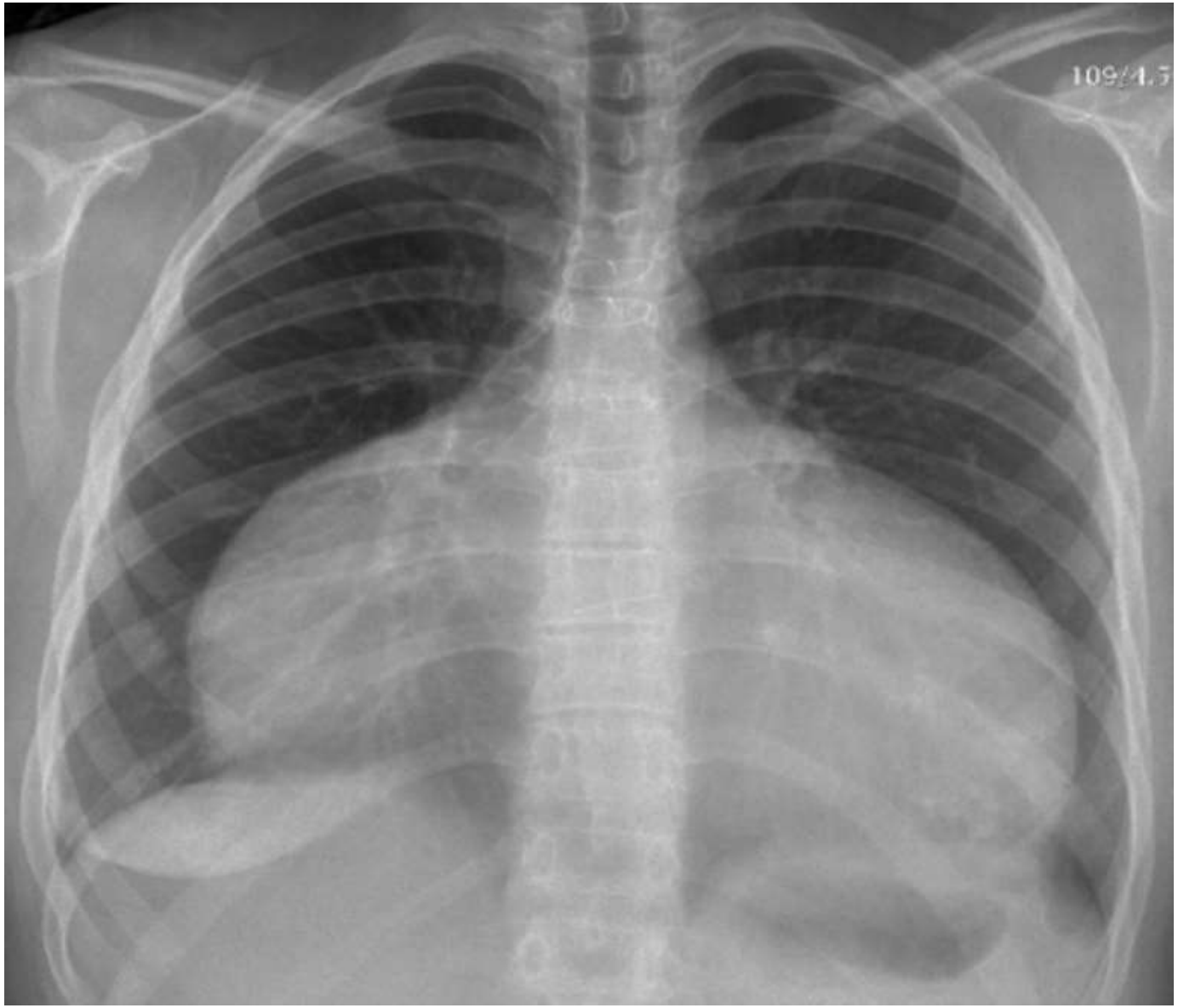
La vena cava superior del donante, la vena grande que lleva la sangre de la cabeza, el cuello y los brazos, se une a la aurícula derecha del receptor para que la sangre del cuerpo fluya ahora a ambos corazones.

A 24-year-old woman was admitted with a 24 h history of palpitations and breathlessness. She had no previous history of chest pain, dizziness or syncope. She had previously undergone a heterotropic heart transplant 14 years ago owing to cardiac failure related to idiopathic dilated cardiomyopathy.

A physical examination demonstrated a pulse of 160 bpm with prominent A wave in the jugular venous pulse. Her blood pressure was 98/50 mm Hg, and the apex beat was palpable on both sides of the chest, corresponding to the native and heterotropic transplanted hearts.

Mujer de 24 años que ingresó con antecedentes de palpitaciones y disnea de 24 h de evolución. No tenía antecedentes de dolor torácico, mareos o síncope. Anteriormente había sido sometida a un trasplante cardíaco heterotrópico hace 14 años por insuficiencia cardíaca relacionada con una miocardiopatía dilatada idiopática.

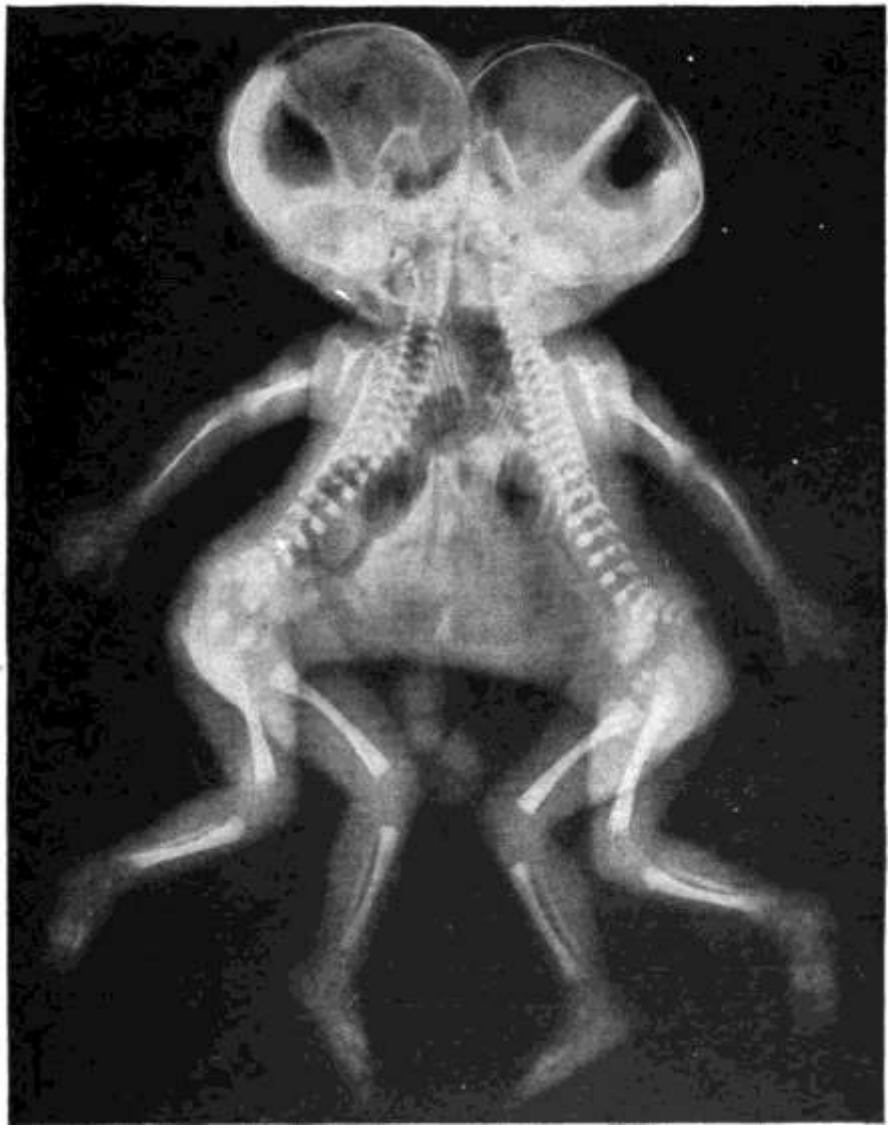
El examen físico demostró una FC de 160 lpm con una onda A en “cañón” prominente en el pulso venoso yugular. Su presión arterial era de 98/50 mm Hg, y con dos choques de la punta palpables a ambos lados del tórax (correspondiente al corazón nativo y al heterotrópico trasplantado 14 años atrás).



Chest radiograph confirmed two hearts: the native and the donor heart in the chest.

A A Khan, J Collinson. Native heart ventricular tachycardia in a heterotropic heart transplant. Case Reports Heart. 2009 Sep;95(18):1524. doi: 10.1136/hrt.2008.164947.

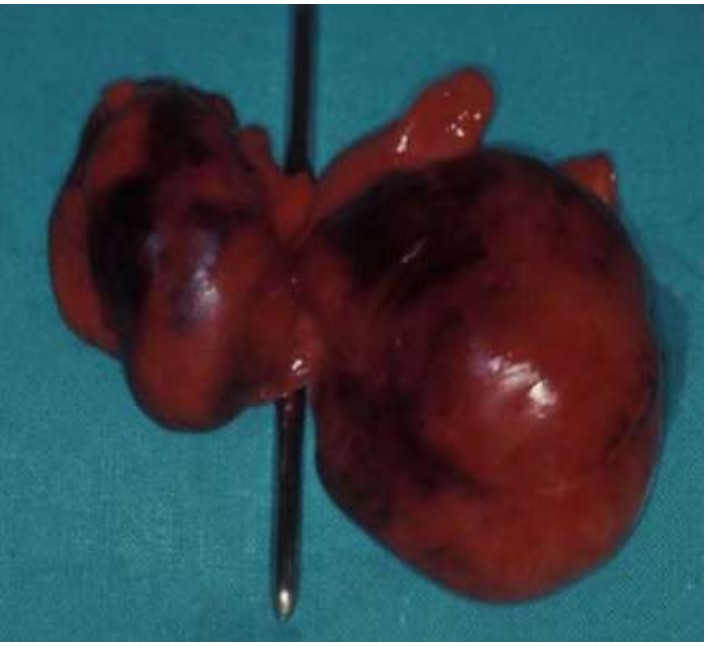
Another possibility of two hearts and two ECGs together is conjoined twins

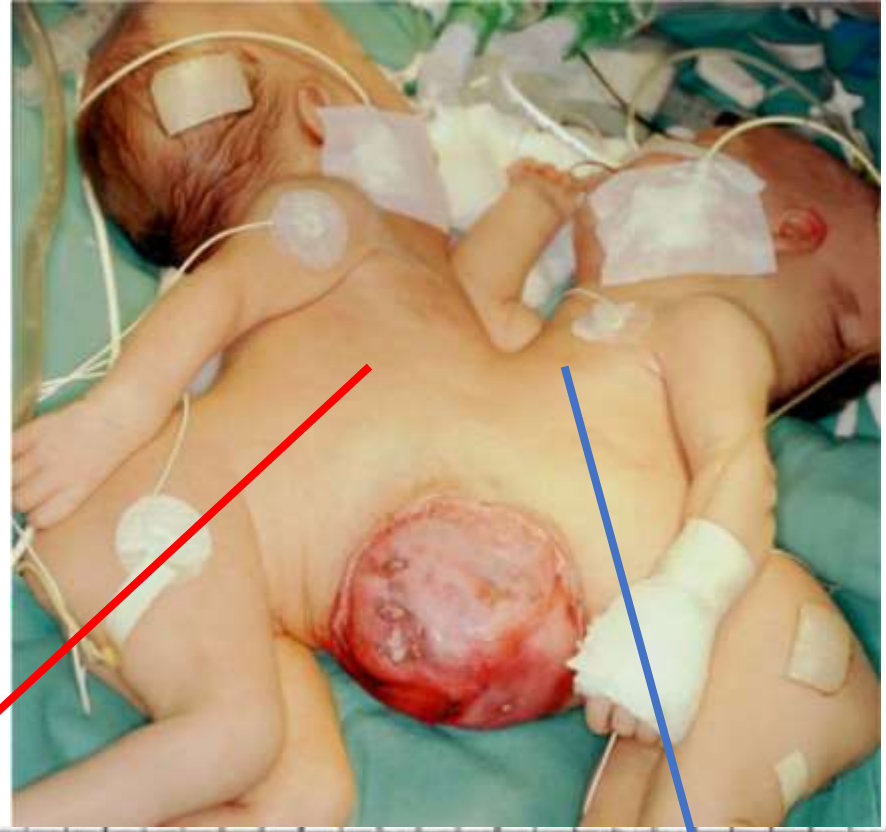


Conjoined twins – sometimes popularly referred to as Siamese twins[1][2] – are identical twins[3] joined in utero. A very rare phenomenon, the occurrence is estimated to range from 1 in 49,000 births to 1 in 189,000 births, with a somewhat higher incidence in Southwest Asia and Africa.[4] Approximately half are stillborn, and an additional one-third die within 24 hours. Most live births are female, with a ratio of 3:1.[4][5]

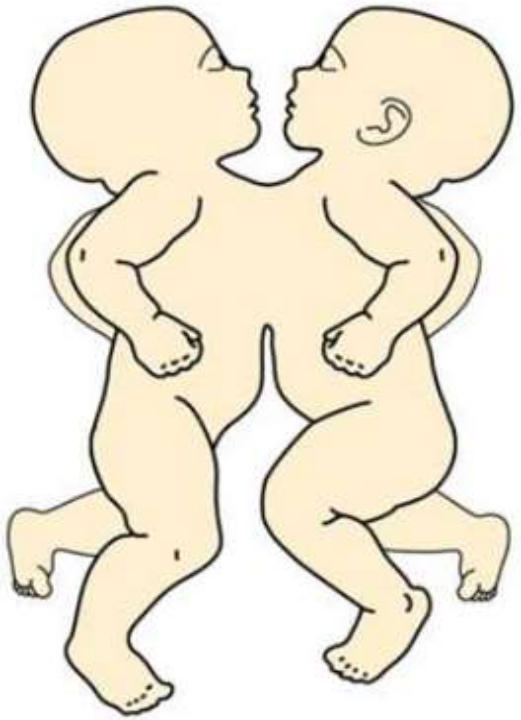
Two contradicting theories exist to explain the origins of conjoined twins. The more generally accepted theory is fission, in which the fertilized egg splits partially.[6] The other theory, no longer believed to be the basis of conjoined twinning,[6] is fusion, in which a fertilized egg completely separates, but stem cells (which search for similar cells) find similar stem cells on the other twin and fuse the twins together. Conjoined twins share a single common chorion, placenta, and amniotic sac, although these characteristics are not exclusive to conjoined twins, as there are some monozygotic but non-conjoined twins who also share these structures in utero.[7]

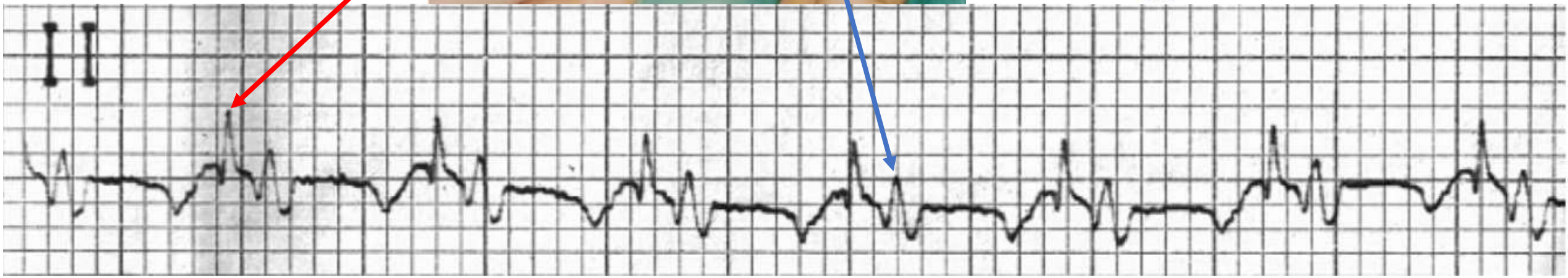
Chang and Eng Bunker (1811–1874) were brothers born in Siam (now Thailand) who traveled widely for many years and were labeled as The Siamese Twins. Chang and Eng were joined at the torso by a band of flesh, cartilage, and their fused livers. In modern times, they could have been easily separated.[8] Due to the brothers' fame and the rarity of the condition, the term "Siamese twins" came to be associated with conjoined twins.



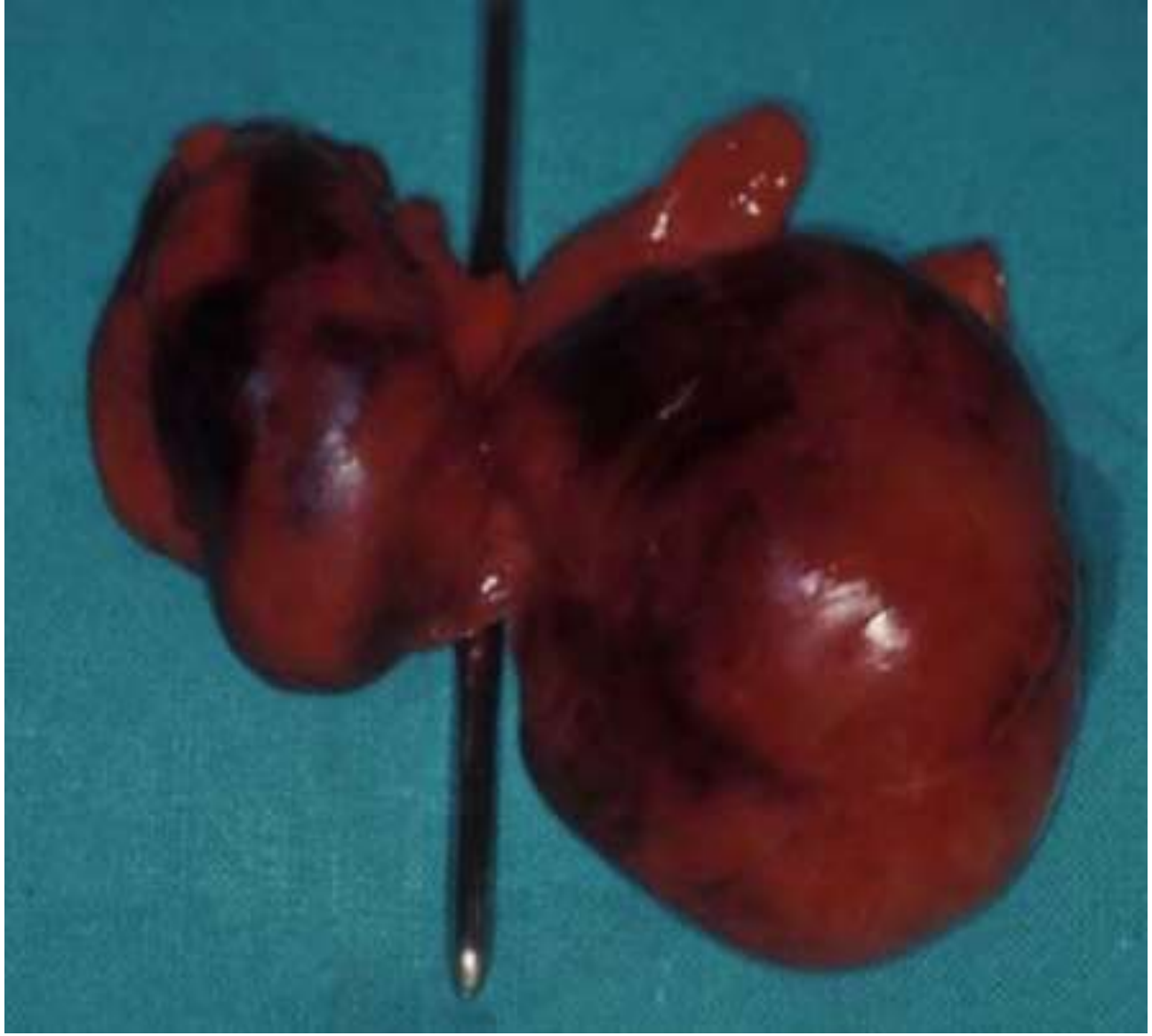


Toracopagus





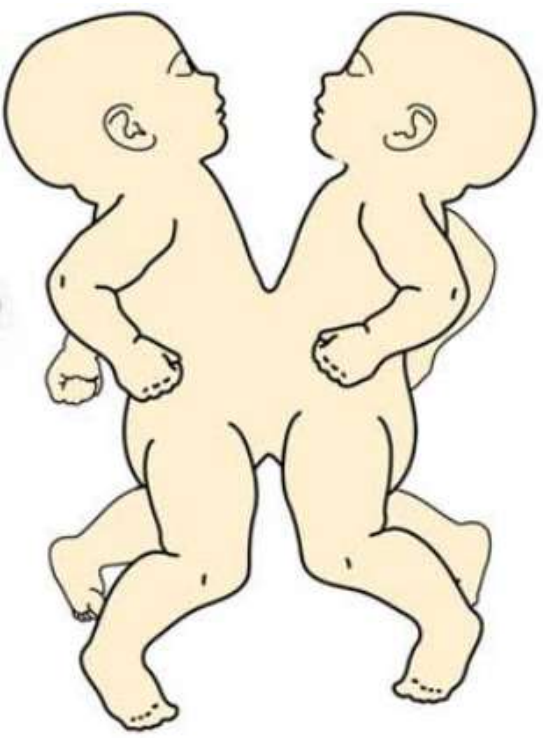
ECG tracing in lead II showing two different QRS complexes alternating at a rate of 176 bpm.



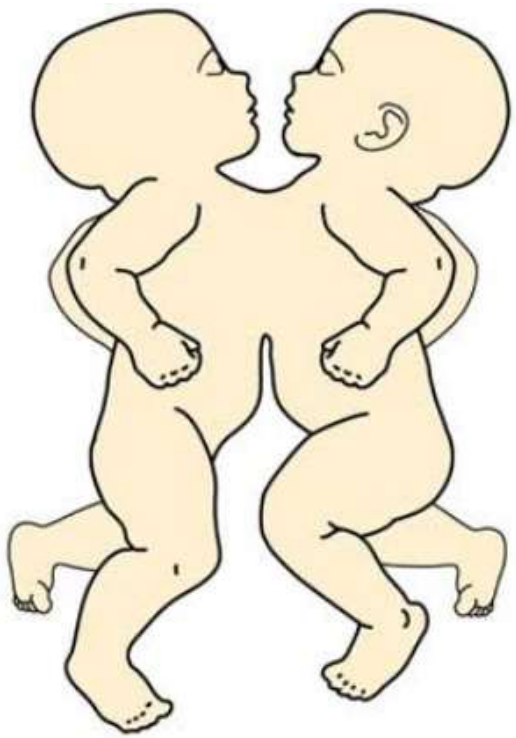
Autopsy examination of the conjoined heart, showing fusion of right atria, and relative hypoplasia of one twin's heart.

Examen de autopsia del corazón conjunto, que muestra fusión de la aurícula derecha e hipoplasia relativa del corazón de un gemelo.

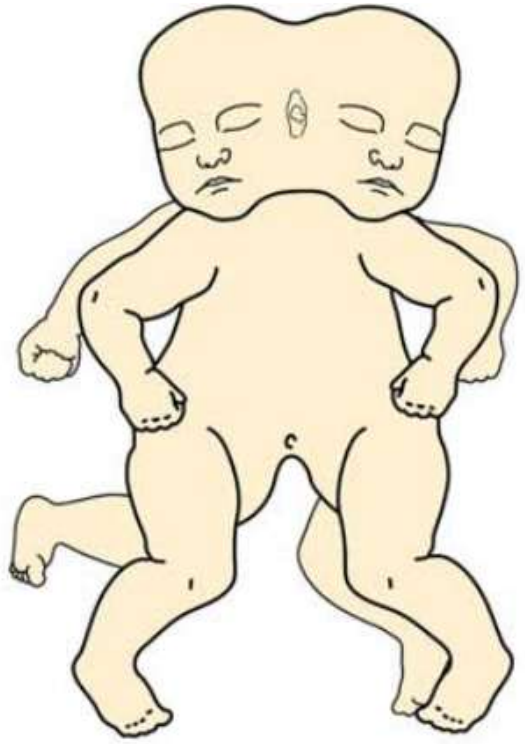
Conjoined twins classification



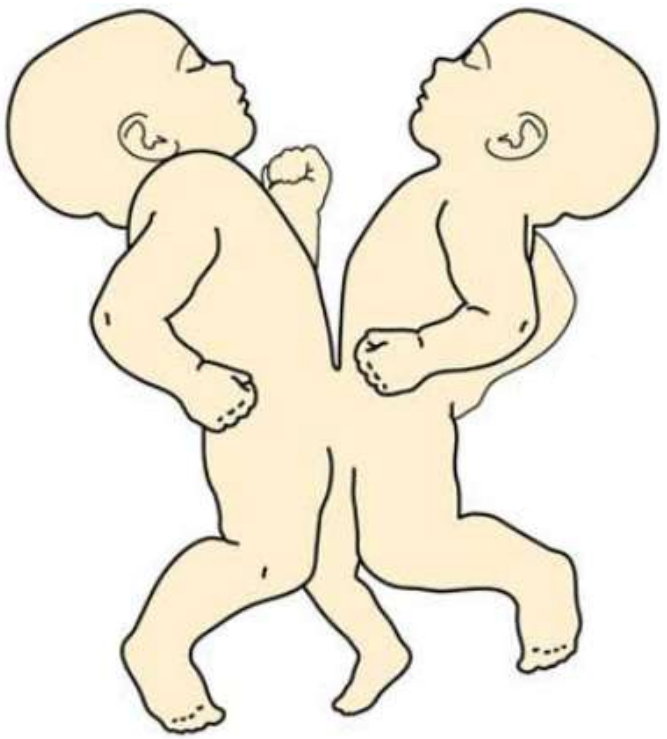
Omphalopagus



Thoracopagus

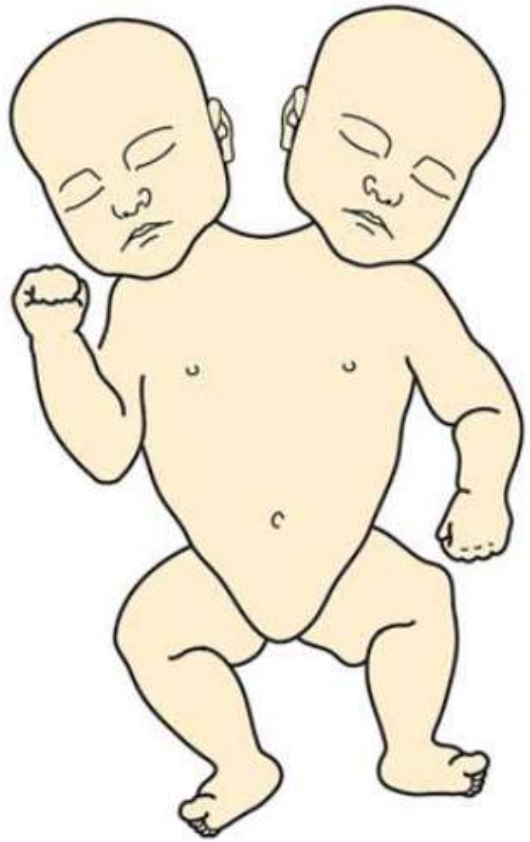


Cephalopagus

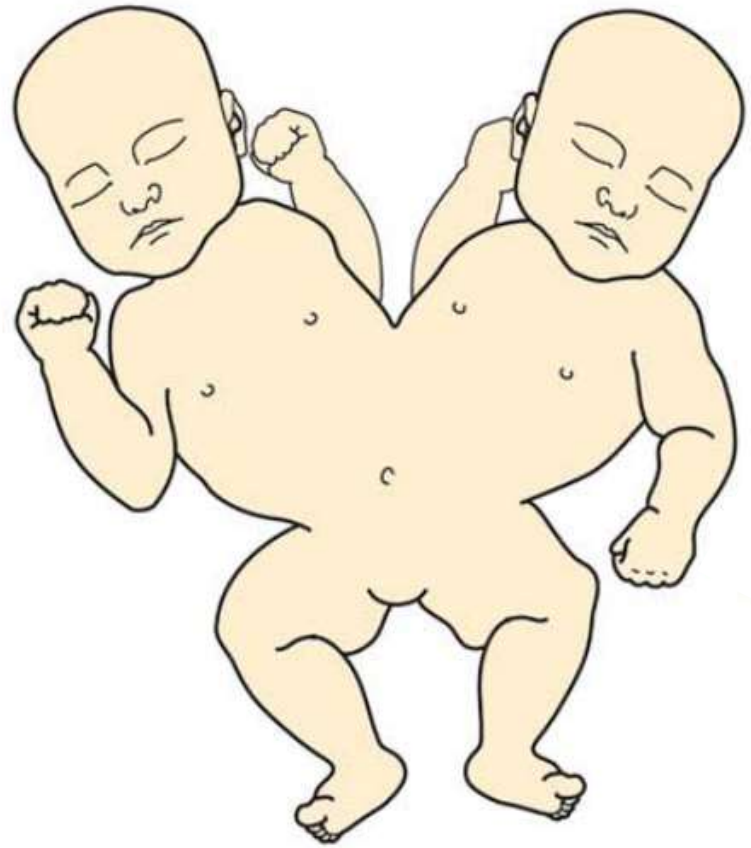


Ischiopagus

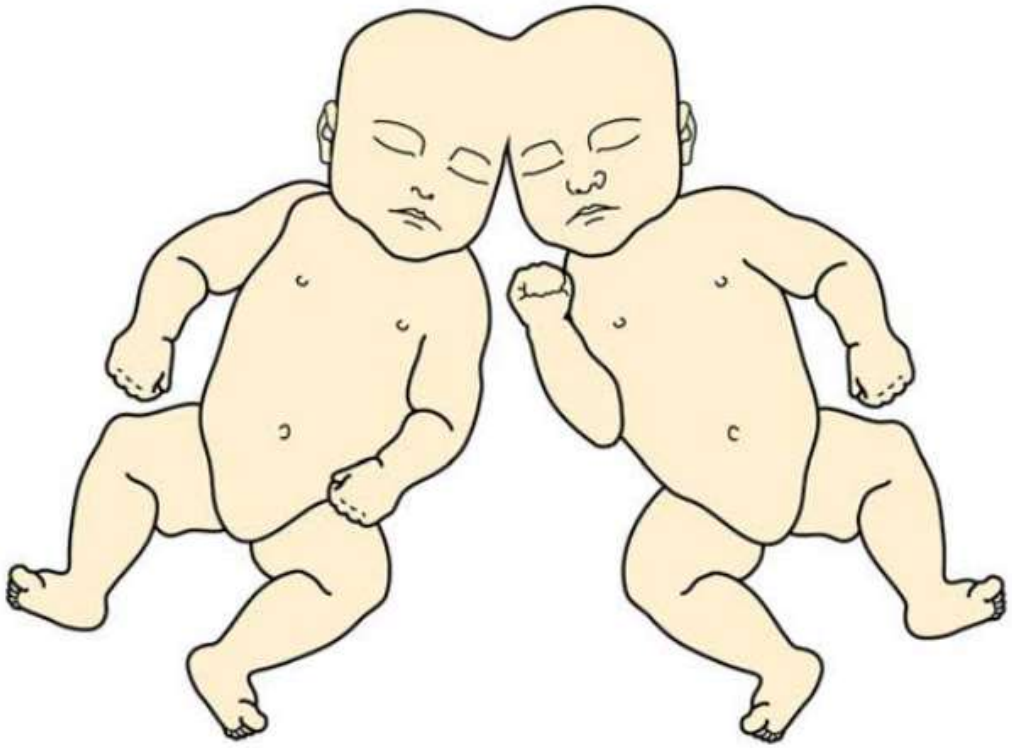
Diprosopus Parapagus



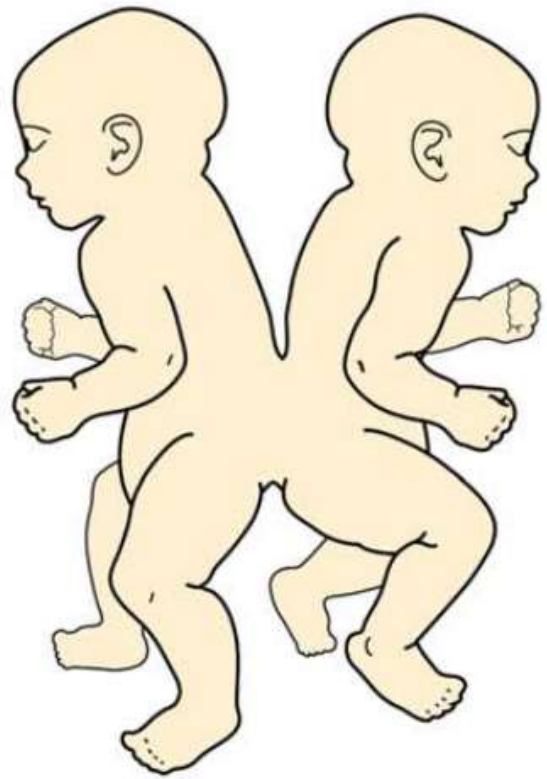
Dicephalus Parapagus



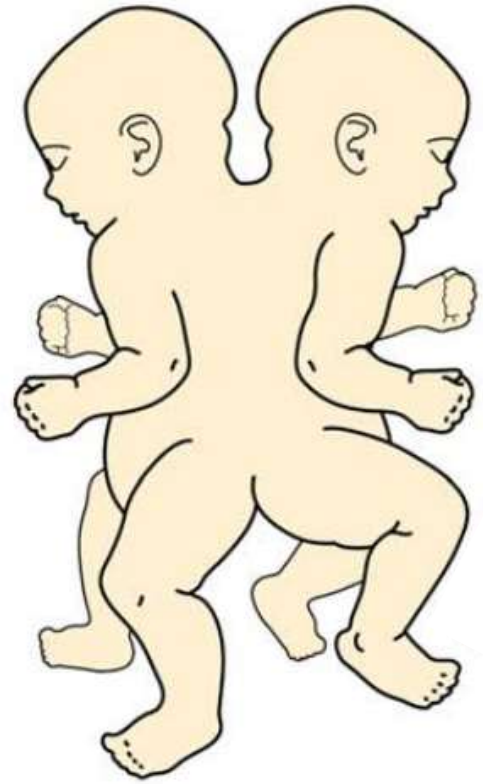
Dithoracis Parapagus



Craniopagus



Pygopagus



Rachipagus

References

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3. Conjoined Twins haFacts. University of Maryland Medical Center. Archived from the original on 6 January 2012. Retrieved 6 Jan 2012.
4. Carnevale, Francisco Cesar; Borges, Marcus Vinicius; Affonso, Breno Boueri; Pinto, Ricardo Augusto de Paula; Tannuri, Uenis; Maksoud, João Gilberto (April 2006). "Importance of angiographic study in preoperative planning of conjoined twins: case report". Clinics. 61 (2): 167–70. doi:10.1590/S1807-59322006000200013. PMID 16680335.
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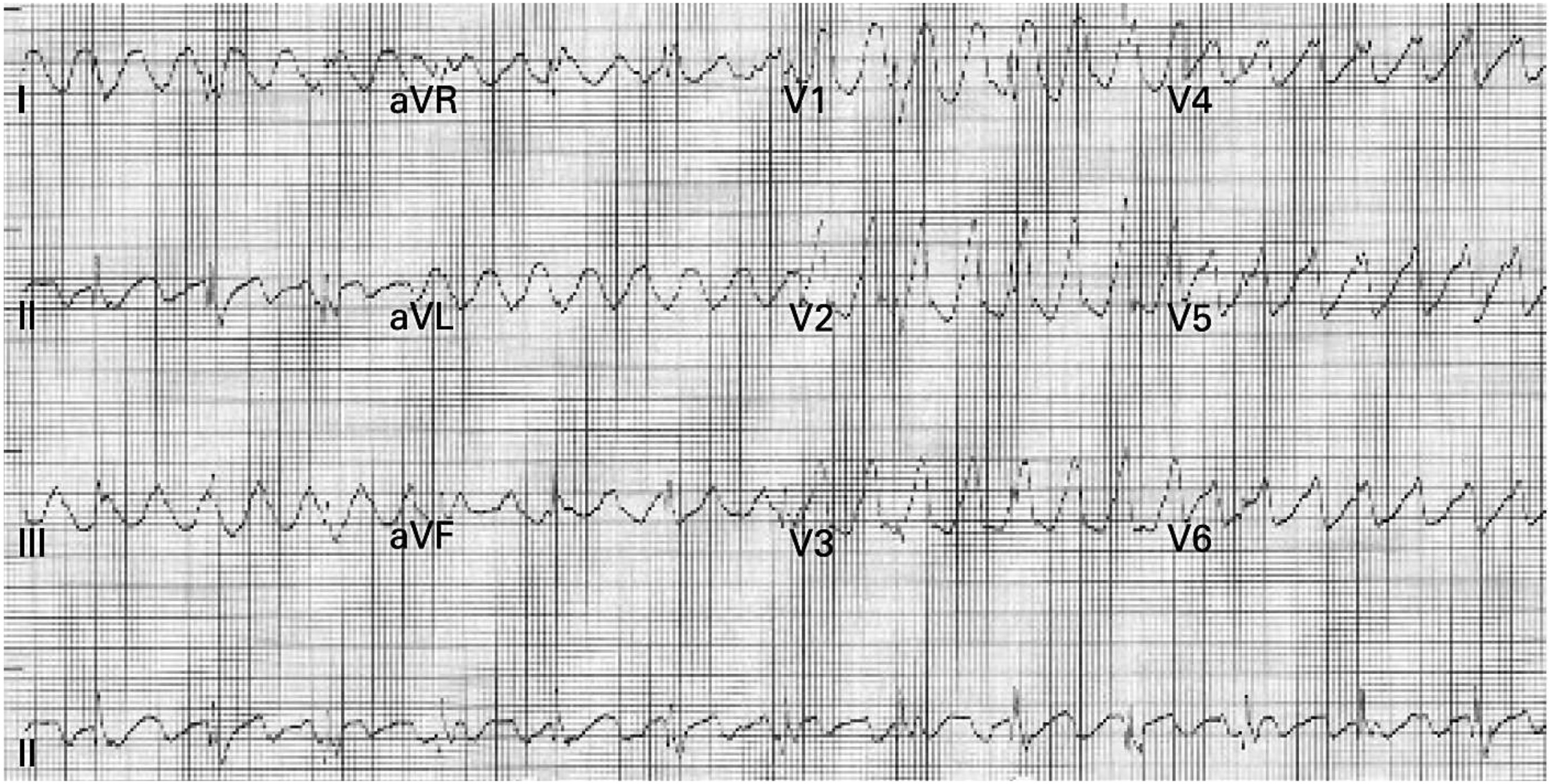
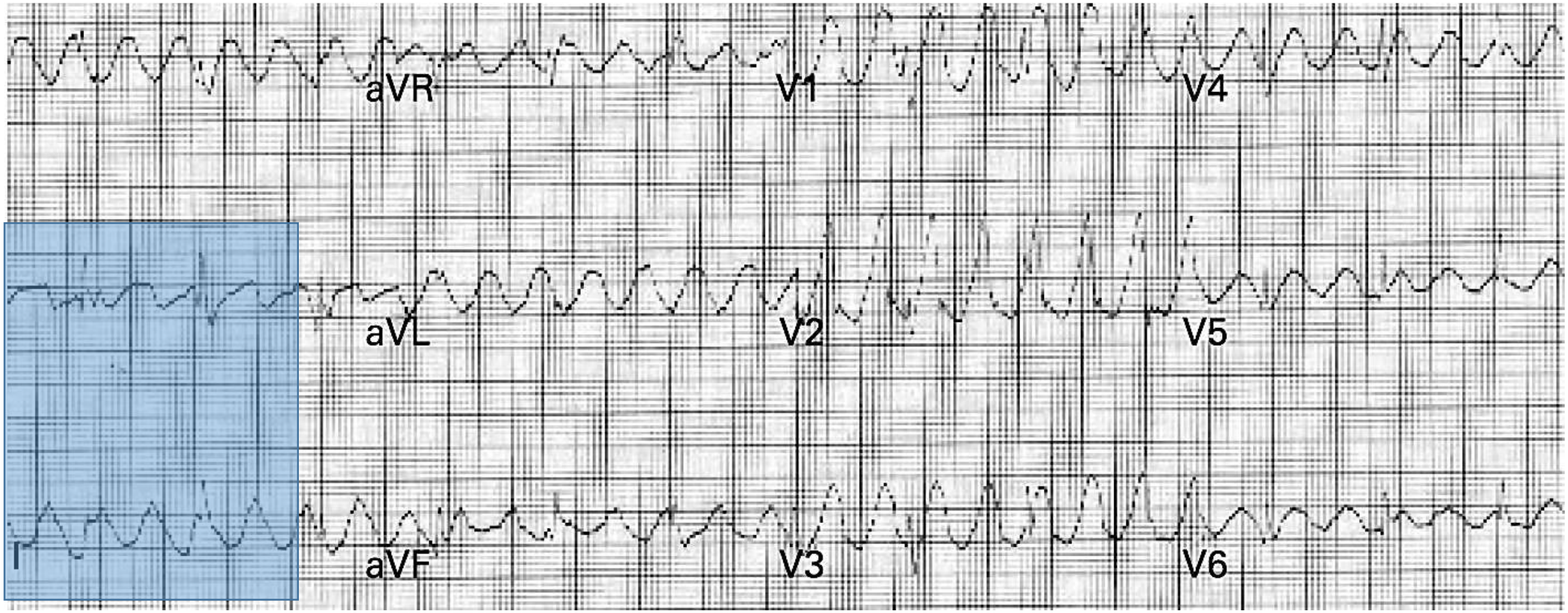
7. Tao Le; Bhushan, Vikas; Vasan, Neil (2010). First Aid for the USMLE Step 1: 2010 20th Anniversary Edition. USA: The McGraw-Hill Companies, Inc. p. 121. ISBN 978-0-07-163340-6.
8. h2g2 - Twins - A369434. Bbc.co.uk. Retrieved 2014-08-03.

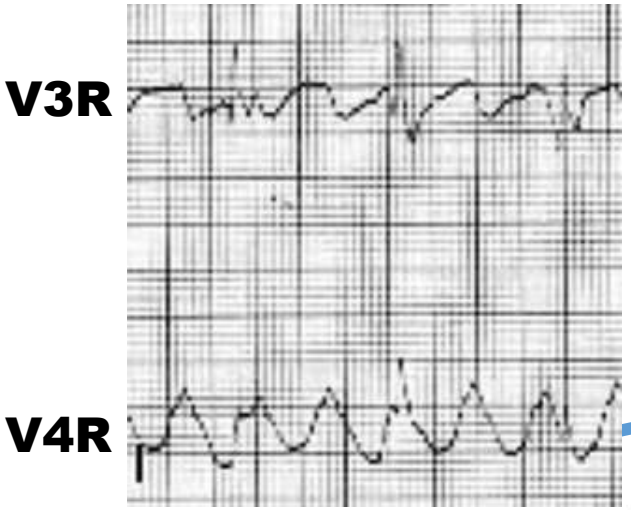


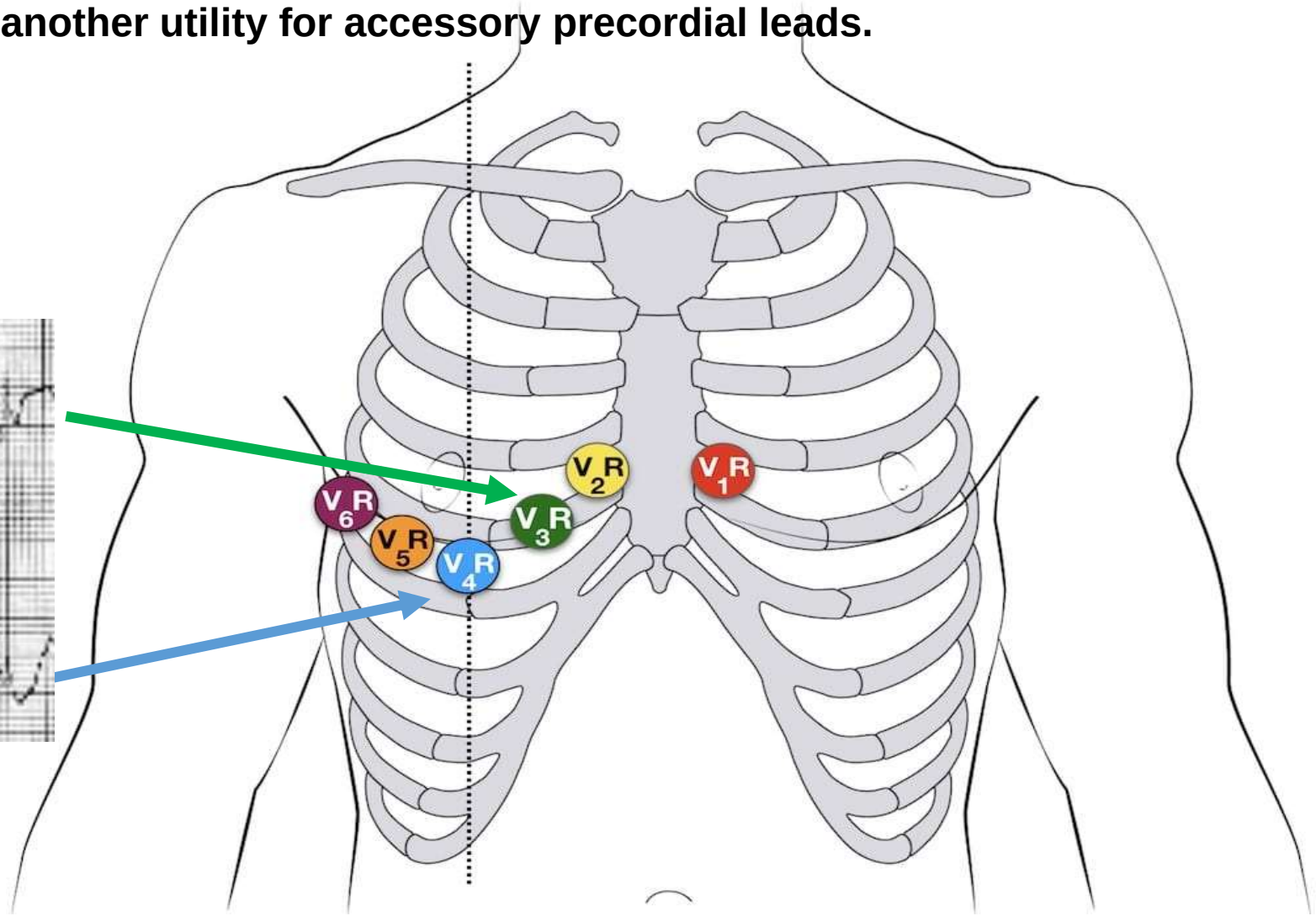
ECG diagnosis: broad complex VT compatible with monomorphic VT of the native heart.



Right-sided 12-lead electrocardiogram; all precordial leads were swapped from left to the right. Stable sinus rhythm is noted in V4R to V6R. See ludic explanation in the next slide.

The use of additional accessory right precordial leads V3R, V4R for RV infarction and in children is indicated in case of suspected LCx obstruction or lateral infarction. Additionally, in VT of heterotropic heart transplantation!! This is another utility for accessory precordial leads.





Thygesen K, Alpert JS, Jaffe AS, et al, ESC Committee for Practice Guidelines. Third universal definition of myocardial infarction. Eur Heart J 2012;33(20):2551–2567.