

Congested

Citation for published version (APA):

Bos, K. H. J., Ariës, M. J. H., van der Leij, C., & Heuts, S. (2022). Congested: A Clinical Presentation of the Inferior Caval Vein Syndrome. *American Journal of Respiratory and Critical Care Medicine*, 206(5), 625-627. <https://doi.org/10.1164/rccm.202201-0118IM>

Document status and date:

Published: 01/09/2022

DOI:

[10.1164/rccm.202201-0118IM](https://doi.org/10.1164/rccm.202201-0118IM)

Document Version:

Accepted author manuscript (Peer reviewed / editorial board version)

Document license:

CC BY-NC-ND

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

www.umlib.nl/taverne-license

Take down policy

If you believe that this document breaches copyright please contact us at:

repository@maastrichtuniversity.nl

providing details and we will investigate your claim.

Congested: A Clinical Presentation of the Inferior Caval Vein Syndrome

Inferior caval vein syndrome

Koen H.J. Bos, MD^{1,2}, Marcel J.H. Ariës, MD, PhD¹, Christiaan van der Leij, MD, PhD³, and
Samuel Heuts, MD, PhD⁴

¹ Department of Intensive Care Medicine, Maastricht University Medical Center, Maastricht, the Netherlands

² Department of Intensive Care Medicine, Amphia Medical Center, Breda, the Netherlands

³ Department of Radiology and Nuclear Medicine, Maastricht University Medical Center, Maastricht, the Netherlands

⁴ Department of Cardiothoracic Surgery, Maastricht University Medical Center, Maastricht, the Netherlands

Conflict of interest: none declared

Funding; none received

Contributorship:

KB: conception, acquisition, analysis of data - drafting the work - final approval - agreement to be accountable for all aspects of the work.

MA: conception - revising the work - final approval - agreement to be accountable for all aspects of the work.

CvdL.; acquisition of data - revising the work - final approval - agreement to be accountable for all aspects of the work.

SH: acquisition, analysis of data - drafting the work - final approval - agreement to be accountable for all aspects of the work.

Descriptor number: 4.5 Diagnostic Techniques & Monitoring

Word count: 347

Correspondence to:

Samuel Heuts, MD, PhD

Department of Cardiothoracic Surgery

P. Debyelaan 25, 6229HX

Maastricht, the Netherlands

E: sam.heuts@mumc.nl

CONFLICT OF INTEREST

None declared.

FINANCIAL DISCLOSURES

None declared.

A 52-year old male patient presented to our emergency department with respiratory distress, clinically and biochemically in shock (lactate 11 mmol/L). On clinical examination, a blueish discoloration of the abdomen and lower extremities was observed (**Figure 1A**). On contrast-enhanced computed tomography, the inferior caval vein (IVC) was compressed at the level of the 4th lumbar vertebra by a massive collection of lymph nodes (**Figure 1B,C**), confirming diagnosis of IVC syndrome (IVCS). Emergency invasive contrast venography (**Figure 2A,B**) and subsequent thrombectomy was performed in our hybrid operating room with venous stent recanalization (**Figure 2C**). The patients' condition improved remarkably, after which he was discharged home on the sixth postoperative day on acenocoumarol. Diagnostic follow-up excluded malignancies, and laboratory findings were negative for tumor markers. Biopsy of the nodal collection was inconclusive. Two weeks postoperatively, magnetic resonance venography revealed a marked decrease of peri-caval vein thrombosis without evidence of pathological lymph nodes (**Figure 3**).

IVCS is less common than its superior caval vein counterpart and its true incidence has never been reported, potentially leading to under-recognition of this syndrome (1). The etiology of IVCS depends on the location of blood flow interruption and can roughly be divided into intraluminal obstructive, and external compressive causes. Intraluminal obstruction may be caused by a primary thrombotic event, while external IVC compression is usually the consequence of malignant growth of nearby organs (2). Another well-known risk factor is pregnancy, during which the distended uterus may progressively compress the IVC (3). In addition, prior abdominal surgery, obesity and presence of congenital malformations such as May-Thurner or Budd-Chiari syndrome might predispose to IVCS (2, 4). Treatment of ICVS depends on its etiology, and usually requires resolution of the cause of compression. In many patients, anticoagulant therapy might resolve or prevent future IVCS, while intravascular procedures and surgery are reserved for more critical cases (1).

Although IVCS is obstructive of nature, it might fool the clinician as it mimics hypovolemic shock, while distension of jugular and upper torso veins is absent. Immediate recognition and treatment is imperative as it might lead to end-organ failure and eventual death.

FIGURE LEGENDS

Figure 1. Findings on clinical and computed tomography examination.

(A) blueish discoloration of the abdomen and lower extremities with clear evidence of venous congestion, (B, C) arterial contrast-enhanced coronal (B) and axial (C) computed tomography images revealing an inferior caval vein syndrome caused by a compressive collection of lymph nodes (arrows indicate the location of lymph node collection).

Figure 2. Pre- and postprocedural contrast venography.

(A, B) preprocedural imaging of the right (A) and left (B) femoral vein (asterix indicates occlusion), (C) postprocedural venography of the inferior caval vein (arrow indicates stent).

Figure 3. Follow-up magnetic resonance venography.

A remarkable spontaneous decrease of paracaval lymphadenopathy and caval vein compression without evidence of pathological lymph nodes (arrow indicates prior location of compressive nodes).

REFERENCES

1. McAree BJ, O'Donnell ME, Fitzmaurice GJ, Reid JA, Spence RA, Lee B. Inferior vena cava thrombosis: a review of current practice. *Vasc Med* 2013; 18: 32-43.
2. Lawrensia S, Khan YS. Inferior Vena Cava Syndrome. StatPearls. Treasure Island (FL); 2022.
3. Lanni SM, Tillinghast J, Silver HM. Hemodynamic changes and baroreflex gain in the supine hypotensive syndrome. *Am J Obstet Gynecol* 2002; 187: 1636-1641.
4. Liddell RP, Evans NS. May-Thurner syndrome. *Vasc Med* 2018; 23: 493-496.

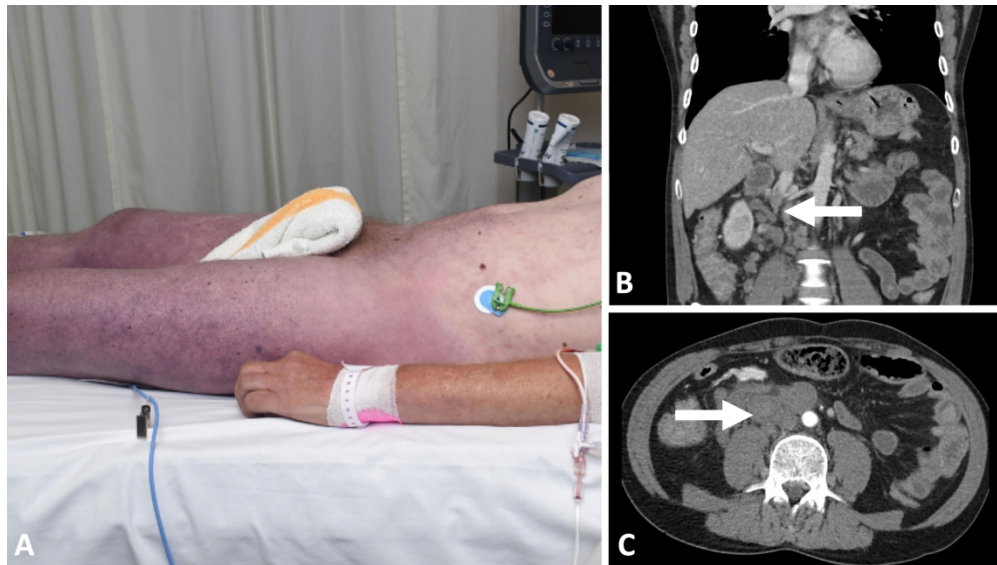


Figure 1. Findings on clinical and computed tomography examination. (A) blueish discoloration of the abdomen and lower extremities with clear evidence of venous congestion, (B, C) arterial contrast-enhanced coronal (B) and axial (C) computed tomography images revealing an inferior caval vein syndrome caused by a compressive collection of lymph nodes (arrows indicate the location of lymph node collection).

338x190mm (300 x 300 DPI)

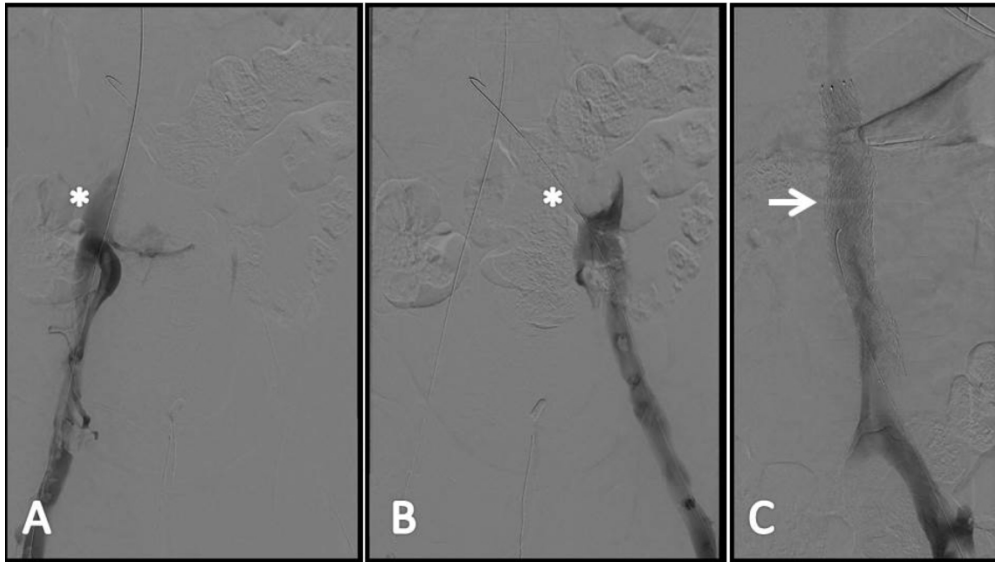


Figure 2. Pre- and postprocedural contrast venography. (A, B) preprocedural imaging of the right (A) and left (B) femoral vein (asterisk indicates occlusion), (C) postprocedural venography of the inferior caval vein (arrow indicates stent).

1045x585mm (72 x 72 DPI)

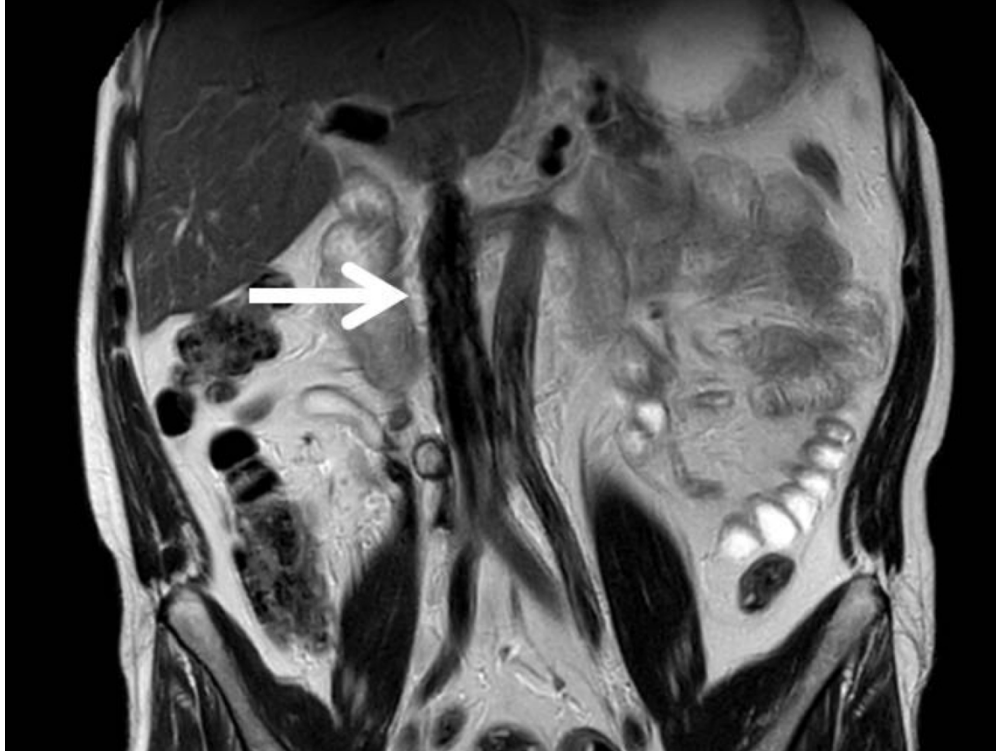


Figure 3. Follow-up magnetic resonance venography. A remarkable spontaneous decrease of paracaval lymphadenopathy and caval vein compression without evidence of pathological lymph nodes (arrow indicates prior location of compressive nodes).

1057x793mm (72 x 72 DPI)