Absence of inferior vena cava in 14-year old boy associated with deep venous thrombosis and positive Mycoplasma pneumoniae serum antibodies- a case report.

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Abstract:

Absence of the inferior vena cava is a rare vascular anomaly. It usually remains asymptomatic in children, often manifesting with bilateral deep venous thrombosis in the early adults. Absence of the inferior vena cava is a risk factor for deep vein thrombosis. M. pneumoniae infection might be associated with deep venous thrombosis. Usually, DVT deep venous thrombosis due to M. pneumoniae infection is associated with positive serum anticardiolipin antibodies. To our knowledge, this is the first reported case of deep venous thrombosis associated with M. pneumoniae serum antibodies indicating early infection with negative Anticardiolipin serum antibodies in adolescent with absence of inferior vena cava.

14-year old boy was admitted to the pediatric unit few days after the appendectomy complaining with pain of the left hip that caused him unable to walk. The pain was accompanied with subfebrile temperature. After clinical examination and additional tests a boy was diagnosed with a deep venous thrombosis. Computed tomography revealed absence of the vena cava inferior distally to the hepatic veins and varices of the collateral circulation in the pelvis. Anticardiolipin IgM and IgG antibodies and antinuclear antibodies were not detected. Additionally, the Mycoplasma pneumoniae antibodies in classes IgM, IgA and IgG were detected in serum as another risk factor of thrombosis. After the initial treatment with low-molecular-weight heparin in combination with clarithromycin the clinical condition of the patient improved. The patient is a candidate for life-long anticoagulation therapy.

In this case Mycoplasma pneumoniae antibodies were associated with deep venous thrombosis in child with congenital absence of inferior vena cava. Uncommonly for deep venous thrombosis due to M. pneumoniae infection, anticardiolipin antibodies were not detected in serum. It is important to remember in clinical practice that Mycoplasma
pneumoniae affects coagulability an may trigger thrombosis. The pathophysiology of this process remains unknown.

Keywords: absence of inferior vena cava, appendectomy, deep venous thrombosis, hypercoagulability, low-molecular-weight heparin, Mycoplasma pneumoniae antibodies;

Background:

Congenital absence of the inferior vena cava (AIVC) is a rare vascular anomaly, often asymptomatic and identified serendipitously. Because AIVC is a defect that cannot be detected using b-mode USG, its prevalence is underestimated. The prevalence of AIVC has been estimated at 0.6-4% but some researches based on CT and/or MRI reported that AIVC may be present in 5-9.5% of young subjects with venous thrombosis. None of these studies evaluated AIVC prevalence in the general population [1]. IVC anomalies, including AIVC, are increasingly being recognized as the risk factors for deep vein thrombosis (DVT), since the collateral circulation does not provide adequate drainage of the lower limbs. Thrombosis associated with AIVC is often reported as a bilateral DVT that occur in young adults, much younger than the mean age of DVT presentation [2]. Some reports describe cases of DVT due to IVC anomalies in adolescents [3,4]. There is no standard management strategy established for patients with DVT due to AIVC. In most cases, life-long anticoagulation therapy could be indicated while there are some reports of recurrence of thrombosis after discontinuation of the treatment [5]. Therapeutic approach in children with DVT is different from the strategy in adults. In children with first DVT secondary to structural venous abnormalities either unfractionated heparin (UFH) or LMWH are suggested for acute anticoagulant therapy and ongoing treatment [6]. In prematurely closed randomized controlled trial (RCT), LMWH were
associated with a low risk of bleeding and there was no suggestion that LWMH results in inferior outcomes compared with UFH/oral anticoagulants in children [7]. Mycoplasma pneumoniae is a common cause of community-acquired pneumonia in school-aged children and adolescents but its association with thrombosis is yet not well described. Previously reported extrapulmonary manifestations rarely applied to thrombosis and the pathophysiology of hypercoagulability in M. pneumoniae infection remains unknown. Most of the few reported cases of thrombosis applied to arterial location [8]. In several cases of M. pneumoniae infection, transient anticardiolipin antibodies (aCL) associated with thrombosis have been reported, which might contribute to hypercoagulability. The presence of transient aCL associated with M. pneumoniae infections is well documented, but their pathogenic role is uncertain [9]. Other reported antibodies from the antiphospholipid antibodies (aPL) group that promote hypercoagulability are lupus anticoagulant and beta-2 microglobulin antibodies, which were described in several cases of thrombosis in association with M. pneumoniae infection. One review reports that in seven patients of the eight cases in which aPL were not present, thrombosis occurred in the brain vessels, in one case the thrombosis site was superior mesenteric artery [10].

Our case is unusual for many reason. There are only a few descriptions of DVT due to AIVC presentation in children. The veins of collateral circulation that take over the function of IVC in AIVC could be insufficient for lower limb drainage, which might effect in hypercoagulability. The immature coagulation system is not promoting thrombosis and AIVC usually remains asymptomatic in children, manifesting in the early adults, especially in presence of thrombosis risk factors. In our patient, the postoperative period was not connected with prolonged immobilization but purulent appendix was a site of local inflammation before the surgery. M. pneumoniae infection itself might be DVT triggering factor but the
mechanism of its presentation in our patient remains unknown. It is uncommon for DVT due
to M. pneumoniae infection not to be associated with serum aCL antibodies.

Case presentation:

14-year old Caucasian boy was admitted to the pediatric unit complaining with severe
pain of the left hip and internal thigh area that was exacerbated by compression and flexion of
a hip. The patient was unable to walk and stand upright. Clinical examination revealed
femoral artery pulse asymmetry with weaker left femoral pulse combined with
asymmetrically increased circumference of the left lower limb greater by 1 cm at the levels of
mid-thigh and mid-calf. Additionally, salmon-colored rush was spread on his trunk. 2 weeks
before admission the patient underwent appendectomy with removal of purulent but not
perforated appendix. Ultrasonography (USG) with the Doppler probe during postoperative
period provided atypical image with difficulties in visualizing the inferior vena cava. The pain
occurred 10 days after surgery and was constricting the movement of the left hip.
Continuously aggravating pain was accompanied with subfebrile temperature (38 °C [<100.4
°F]) and elevated C-reactive protein (CRP) levels. The abdominal USG and roentgenograms
of the hip showed no abnormalities, but amoxicillin treatment has been initiated. After 5 days,
due to the constantly elevated CRP levels and temperature that raised up to (38 °C [<100.4
°F]), the patient was referred to the pediatric unit. At admission CRP level was in 8-fold
reference range, D-dimer and fibrinogen concentrations were also elevated with values 326
µg/ml and 615 mg/dL, respectively. The ultrasonography showed left lower limb deep venous
thrombosis, vena cava inferior was not visualized. CT angiogram (Fig.1.) revealed the
absence of inferior vena cava from common iliac veins connection to the confluence of
hepatic veins. The patient has a short segment of inferior vena cava between the normal sized
hepatic veins and the right atrium. The venous drainage from lower limbs and pelvis was
found to be supplied by collateral circulation that includes varicosely dilated veins: azygos and hemiazygos, paraspinal and mesenteric. Additionally, the CT angiogram showed thrombus within left-sided popliteal vein, femoral vein, external and internal iliac veins and common iliac vein to the level of L4 vertebra. Further diagnostics were consequently performed. Anticardiolipin IgM and IgG antibodies and antinuclear antibodies were not detected. Tests for rheumatoid factor, anti-CCP antibodies and thrombophilia screening, which included genetic diagnostics for Leiden V factor, protein C and protein S, were also negative. The antithrombotic treatment has been started with 80 mg of enoxaparin s.c. twice daily with elevation and compression dressings for the full length of left lower limb. Control laboratory tests performed after 2 days of low molecular weight heparin (LMWH) treatment revealed that CRP, D-dimer and fibrinogen concentrations have lowered. Patient’s temperature was constantly elevated and did not decrease below 100.4 °F (38 °C). Enzyme immunoassay (EIA) in serum detected Mycoplasma pneumoniae IgM, IgA and IgG antibodies with concentrations 1.258 S/CO, 25.183 EIU and 170.619 EIU, respectively. This pattern is typical for the early stage of infection. The antibiotic was changed to clarithromycin p.o. with the effect of normothermia after two days of treatment. The pain relieved, skin rash faded and after a couple of days both disappeared. The patient received clarithromycin in the recommended dose for 14 days. The initial antithrombotic treatment has been continued. The patient was advised to use fitted compression stocking, elevate leg at rest and avoid thrombogenic risk factors such as strenuous physical activity or prolonged immobilization. After 1 month, Mycoplasma pneumoniae antibodies in classes IgM, IgA and IgG were constantly being detected in serum and the concentrations indicated early infection. USG performed after 3 months of LMWH treatment showed reduction of initial thrombosis with recanalization of the left popliteal vein. The antithrombotic treatment has been continued with
80 mg of enoxaparin s.c. twice daily with subsequent USG control planned after following 3 months.

Conclusions:

Absence of inferior vena cava is a risk factor for deep venous thrombosis. Mycoplasma pneumoniae infection, which is popular among school children, might be a cause of hypercoagulability. The pathophysiology of this process remains unknown. To our knowledge, this is the first reported case of deep venous thrombosis associated with M. pneumoniae serum antibodies indicating early infection with negative anticardiolipin serum antibodies in adolescent with absence of inferior vena cava.

Consent:

Written informed consent was obtained from the patient for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

List of abbreviations:
aCL- anticardiolipin antibodies; AIVC- absence of the inferior vena cava; aPL- antiphospholipid antibodies; DVT- deep vein thrombosis; LMWH- low molecular weight heparin; M. pneumoniae- Mycoplasma pneumoniae;
Competing interests:

Author of the first draft of the manuscript is Kalicki Boleslaw. All authors have directly participated in the conception, planning, collection, analysis, interpretation of data or critical revision of this manuscript. All authors of this paper have read and approved the submission of this version of the manuscript and takes full responsibility for the manuscript. There are no prior publications or submissions with any overlapping information, including studies and patients. There are no directly related manuscripts or abstracts, published or unpublished, by any authors of this paper. The contents of this manuscript will not be copyrighted, submitted, or published elsewhere, while acceptance by the BMC Pediatrics is under consideration. All authors disclose any potential, perceived, or real conflict of interest. There were no sponsors of this paper with no role in 1) study design; 2) the collection, analysis, and interpretation of data; 3) the writing of the report; and 4) the decision to submit the manuscript for publication. There has been no honorarium, grant, or other form of payment given to anyone to produce the manuscript. All authors of this paper declare not to have any commercial or associative interest that represents a conflict of interest in connection with the work submitted. My Institute’s Department of Pediatrics, Pediatric Nephrology and Allergy, Military Institute of Medicine, Warsaw, Poland representative is fully aware of this submission.

Authors contribution:

4. Piotr Kozinski: critical revision of the article.
5. Mirosław Dziekiewicz: critical revision of the article.
6. Anna Jung: final approval of the article.
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Additional files provided with this submission:

Additional file 1: AIVC_Fig1_legend.doc, 19K
http://www.biomedcentral.com/imedia/1599820461290218/supp1.doc