PULMONARY COMPLICATIONS OF SEPTIC DEEP VENOUS THROMBOSIS: CHARACTERISTIC CT FINDINGS

PLICNÍ KOMPLIKACE SEPTICKÉ HLUBOKÉ ŽILNÍ TROMBÓZY: CHARAKTERISTICKÉ CT NÁLEZY

case report

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Přijato: 15. 11. 2008.

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SUMMARY

Characteristic CT findings of septic deep venous thrombosis in drug users have been reported only very sporadically. Two CT documented cases of acute septic pulmonary embolism resulting from septic deep venous thrombosis in intravenous drug users are described. CT evidence of ongoing sepsis with air inclusions within the thrombus is likely to be an indicator of increased risk of developing septic intrapulmonary complications.

Key words: deep venous thrombosis, sepsis, pulmonary embolism, intravenous drug abuse, computed tomography – CT.

SOUHRN

Charakteristické CT znaky septické hluboké žilní trombózy byly u intravenózních uživatelů drog popsány v literatuře zatím pouze ojediněle. Autoři prezentují dva případy septické plicní embolizace, která se rozvinula jako komplikace septické hluboké žilní trombózy u intravenózních narkomanů, dokumentované prostřednictvím CT vyšetření. Průkaz inkluzí plynu v čerstvém trombu na CT svědčí pro septickou hlubokou žilní trombózu a zvyšuje riziko rozvoje septických plicních komplikací.

Klíčová slova: hluboká žilní trombóza, sepse, plicní embolie, intravenózní aplikace drog, výpočetní tomografie – CT.

INTRODUCTION

Septic thrombosis is a rare complication of deep venous thrombosis. It is almost always associated with history of intravenous drug abuse (1–4). Diagnosis is usually based on clinical as well as laboratory findings of sepsis and radiological findings confirming thrombosis within the deep veins in intravenous drug users (1, 2, 5). The value of helical CT scanning has already been established in cases of deep venous thrombosis (6). However, CT findings of septic deep venous thrombosis in drug users injecting the narcotics into the central deep veins have been reported singularly (2).

Here, we describe two cases of septic deep venous thrombosis in intravenous drug users, diagnosed by means of helical CT, complicated by development of haematogenous pulmonary abscesses.

Case 1

A 33 year old, HIV negative man with history of intravenous drug abuse and insulin dependent diabetes presented with a six day history of a swollen left leg and a two day history of shortness of breath on exertion. The clinical findings included normal body temperature 36.5 °C, white cell count of 19.6, CRP elevated to 245, markedly swollen left leg to the level of the upper thigh, and soft tissue tenderness over the left thigh and the calf. Ultrasound scan of the left leg confirmed the presence of deep venous thrombosis occluding the femoral vein. The patient was placed on bed rest, started on antibiotics and anticoagulation.

Two days later, he developed left sided pleuritic chest pain and tachypnoea. Intravenous contrast enhanced CT scan showed gas and blood clot within the left common and external iliac, as well as femoral vein (Figure 1a) and confirmed presence of multiple septic emboli within the lung parenchyma (Figure 1b). There was no evidence of presence of macroscopic thromboemboli within the pulmonary artery branches on CT. The micro-organism Staphylococcus Aureus was isolated from a peripheral blood sample and the patient was managed conservatively with intravenous antibiotics and low molecular weight heparin. The patient made a gradual recovery.

Case 2

A 32 year old, HIV negative intravenous drug abuser presented with a one week history of right lower limb swelling, associated with fever and chills and a one day history of right groin pain. On examination, he appeared tired, pale, and tachycardic, his body temperature was elevated to 38.2 °C, white cell count was 12.8, and CRP raised to 258. His right lower limb was swollen to the level of the knee and its surface temperature was elevated when compared to the contralateral extremity. He had visible fistulae (sinuses) within both groins due to previous repeated i.v. drug use, with associated tenderness on palpation of the right groin. Ultrasound scan of his right lower limb showed a fresh thrombus occluding the femoral vein and extending to the external iliac vein. He was commenced in intravenous antibiotics and anticoagulation with low molecular weight heparin.

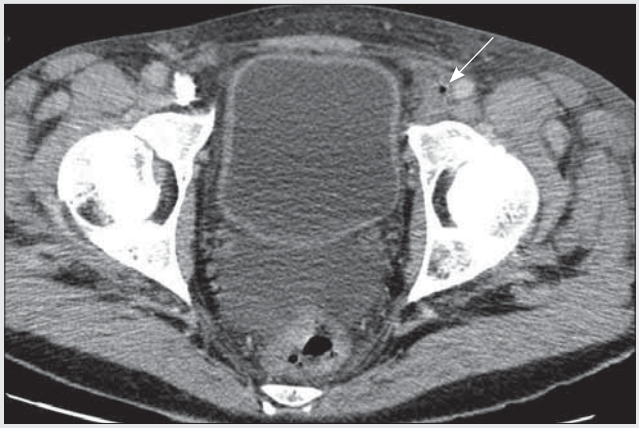
The following day, the patient developed chest tightness and started passing fresh blood from the sinus tract in the right groin. Subsequently, intravenous contrast enhanced CT scan confirmed thrombosis of the right femoral as well as external iliac veins and it revealed presence of gas bubbles within the thrombus. In addition, there was a surrounding haematoma, measuring 5 × 4 cm, adjacent to the medial aspect of the common femoral vein, suggesting venous laceration (Figure 2a). CT pulmonary angiogram revealed multiple rounded pulmonary lesions, some with areas of central cavitation, in keeping with bilateral septic pulmonary embolism (Figure 2b). Again, no macroscopic filling defects within the pulmonary artery branches were found on CTA. The patient underwent surgical drainage of the haematoma and treatment with a prolonged course of antibiotics and anticoagulation. He made a good recovery.

DISCUSSION

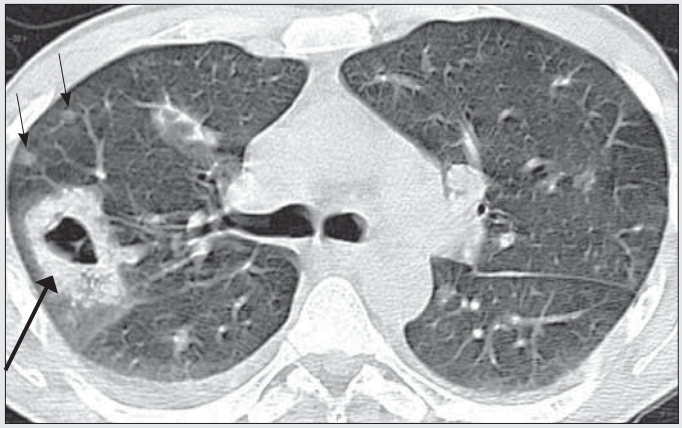
The presence of air within the central veins due to the introduction of a central venous catheter has been well reported previously (7–9). The appearance of gas in the portal system on CT scans has also repeatedly been reported in cases of septic portal vein thrombophlebitis (10, 11). However, documented cases of septic deep venous thrombosis in drug users, diagnosed by means of CT, are exceedingly rare in the literature (2).

The treatment of septic deep venous thrombosis remains controversial, with most authors favouring a conservative approach with antibiotics and anticoagulation (1, 2), and others advocating for surgery (3). Fäh et al (2), in a retrospective review of seven cases, showed that the main infecting organism was Staphylococcus Aureus and that most patients can be treated with a 3–4 week course of antibiotics, without the need for surgery. This was consistent with our experience with the two patients mentioned above. All patients in the study by Fäh et al, had their deep venous thrombosis confirmed by either ultrasonography or helical computed tomography (2). None of these patients developed intrapulmonary abscesses whose CT appearance is otherwise well known and described elsewhere (12).

Both our patients showed the presence of gas within the thrombus in the deep veins (Figure 1a and 2a), and this, we advocate, is an important sign of ongoing sepsis within the thrombus itself. This was confirmed by the isolation of Staphylococcus Aureus from the peripheral blood of the patient in case 1 and, particularly, by the fact that both patients developed intrapulmonary abscesses, as confirmed by CT scans (Figure 1b and 2b). It may be anticipated that CT evidence of gas (i.e. ongoing sepsis) within the thrombus is a valuable indicator of increased risk of developing septic pulmonary embolism. This rises the question whether early CT scan of the affected veins can be diagnostic in these cases.



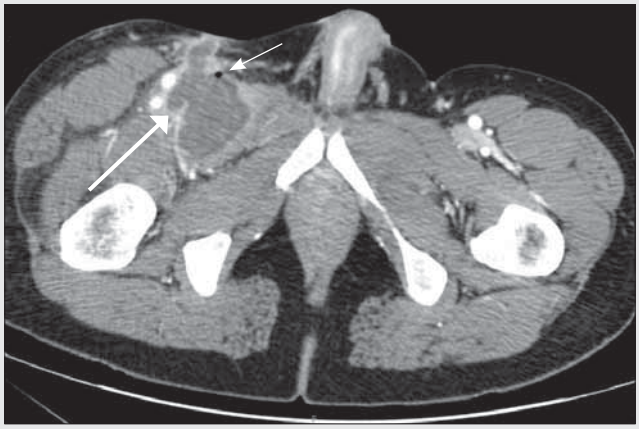
▲ Obr. 1A



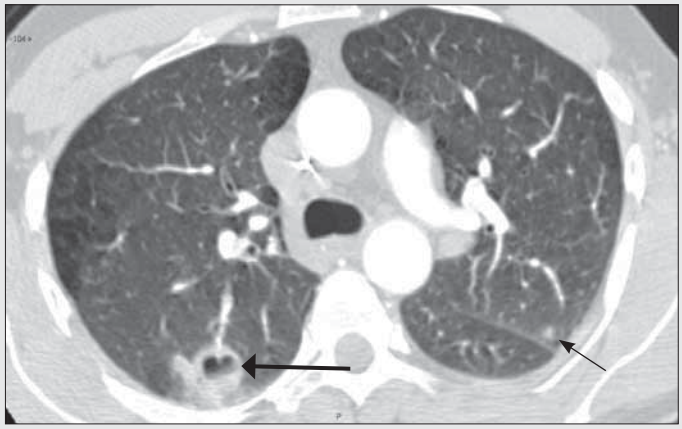
▲ Obr. 1B

Fig. 1A. ***Contrast enhanced helical CT scan of the pelvis in case 1 showing air inclusion (arrow) in the thrombosed left external iliac vein.*** *Due to lack of peripheral venous access, the contrast agent was injected via the right lower extremity vein in this subject.*
Obr. 1A. ***Kontrastní spirální CT vyšetření pánve (případ 1) prokazuje přítomnost bubliny plynu (šipka) v trombu nacházejícím se v levé zevní ilické žíle.*** *Kontrastní látka byla aplikována intravenózně atypicky cestou periferní žíly pravé dolní končetiny vzhledem k omezeným možnostem kanylace periferní žíly u tohoto pacienta.*

Fig. 1B. ***CT of the chest in case 1 showing a large cavitating lesion in the right upper lobe (large arrow) as well as two small lesions of the same aetiology (small arrows).*** *Bilateral small pleural effusions are also noted.*
Obr. 1B. ***CT vyšetření hrudníku (případ 1) prokazuje větší kavitující ložisko v pravém horním laloku (velká šipka) a další dvě drobná ložiska stejné etiologie (malé šipky).*** *Oboustranně je přítomný malý pleurální výpotek.*



▲ Obr. 2A



▲ Obr. 2B

Fig. 2A. ***Contrast enhanced helical CT scan in case 2 shows thrombus in the right common femoral vein (long arrow) and infected haematoma adjacent to the lacerated femoral vein with a gas bubble (short arrow).*** *The haematoma extends into the sinus tract in the right groin.*
Obr. 2A. ***Kontrastní spirální CT vyšetření (případ 2) prokazuje přítomnost trombu v pravé společné femorální žíle (dlouhá šipka) a infikovaný hematom s bublinkou plynu (krátká šipka), přiléhající k lacerované femorální žíle.*** *Hematom se propaguje směrem do chronické píštěle v pravém třísle.*

Fig. 2B. ***CT pulmonary angiogram in case 2 shows an intrapulmonary abscess in the right upper lobe (long arrow).*** *The feeding vessel sign, i.e. pulmonary artery branch leading directly to the nodule, is nicely demonstrated in this case of cavitating septic embolism (arrowhead). A smaller, non-cavitating lesion is also seen in a similar location on the left (short arrow).*
Obr. 2B. ***CT plicní angiogram (případ 2) prokazuje přítomnost plicního abscesu v pravém horním laloku (dlouhá šipka).*** *Dobře je patrný typický znak ("feeding vessel sign") často vídaný u septických embolů, kdy větev arteria pulmonalis míří přímo do kavitujícího uzlu (hlava šipky). Menší, nekavitující ložisko je patrné v obdobné lokalitě vlevo (krátká šipka).*

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