

Immediate phlegmasia cerulea dolens in the postoperative treatment of pelvic fracture. Case report

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ABSTRACT

Phlegmasia cerulea dolens (PCD) is an unusual and serious presentation of deep venous thrombosis (DVT) caused by an obstruction to the venous outflow of the lower limb, which is associated with significant morbidity. To our knowledge, this complication has not yet been reported as a complication of the definitive treatment of a pelvic fracture. We believe that a brief description of the subject matter and the description of the case may be useful to Orthopedic surgeons in similar situations.

Key words: Phlegmasia cerulea dolens; fracture; pelvis; complications.

Level of Evidence: IV

**Flegmasia cerúlea dolens posquirúrgica inmediata en el tratamiento de una fractura de pelvis.
Reporte de un caso**

RESUMEN

La flegmasia cerúlea dolens es una presentación poco habitual y grave de una trombosis venosa profunda producida por una obstrucción al flujo venoso de salida de la extremidad inferior, que conlleva un alto grado de morbilidad. Esta complicación no ha sido comunicada como complicación del tratamiento definitivo de una fractura de pelvis. Consideramos que una breve descripción del tema y la presentación de un caso pueden ser útiles para el cirujano ortopédico ante una situación similar.

Palabras clave: Flegmasia cerúlea dolens; fractura; pelvis; complicaciones.

Nivel de Evidencia: IV

INTRODUCTION

PCD is an unusual and serious presentation of DVT caused by an obstruction to the venous outflow of the lower limb, which is associated with a significant morbidity.¹ Venostasis, following either a mechanical occlusion, an inflammatory occlusion or perivenous inflammatory changes, has also been described to cause severe arterial spasm, as a consequence of the sympathetic stimulation. Additionally, the lymphatic return is slowed due to the diminution of arterial flow, thus contributing to edema formation.²

This condition pathophysiology is characterized by an initial hypercoagulability state followed by a chain of events: an early massive thrombosis (involving both superficial and deep veins), a prominent vascular occlusion, and a microcirculation stasis. An incomplete blockage results in PCD (a reversible condition), while a complete blockage that fails to be resolved with the adequate treatment results in irreversible gangrene and the eventual limb amputation.³⁻⁷ This condition is usually clinically diagnosed and confirmed by arterial and venous Doppler ultrasound.

A search in PubMed and Bireme databases using the MeSH and terms “phlegmasia cerulea dolens and pelvic fracture” and “flegmasia cerúlea dolens y fractura de pelvis” produced zero results, thereby establishing the singularity of this association and the significance of the present case.

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CLINICAL CASE REPORT

A 48-year man was referred to our Center from a first-level hospital, through the hospital network, due to a B1 pelvic-ring fracture according to Tile classification (Figure 1) with a 1-week evolution. At the admission evaluation, the patient was lucid and exhibited no clinical manifestation other than his pelvic fracture which had not been stabilized with any temporary method. The patient had sustained the pelvic fracture secondary to a motor vehicle accident (car-motorcycle collision). The history provided by the patient included the following relevant data: subcutaneous heparin prophylaxis in normal doses since the accident, long-standing heavy smoker (40 cigarettes per day), sedentary, and working as a mechanic.

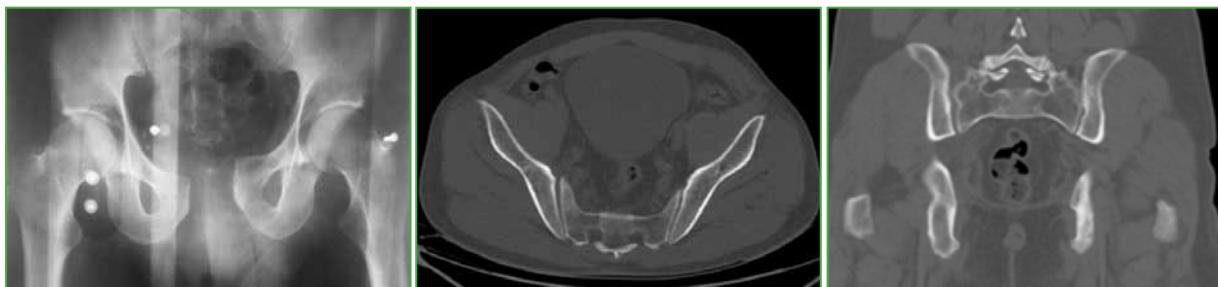


Figure 1. Pelvic X-ray and CT scan section. Images reveal an unstable B1 pelvic-ring fracture (Tile classification).

The patient underwent surgery within 24 hours after admission into our Center: open reduction and internal fixation of the pubic symphysis through a Pfannenstiel approach (approximate surgical time, 50 minutes). Being an open procedure, and only involving the pubic symphysis level, the surgery was performed without extension table or skeletal traction, and no untimely actions were employed in achieving reduction that would generate or mobilize thrombi. At the end of the surgery, when the surgical drapes, the left lower limb exhibited a marbled skin appearance, with good mobility and no pain. Thirty minutes later, once in his room, loss of sensation and mobility below the knee was detected. These findings elicit the immediate request for the vascular surgery team evaluation, which suggested PCD due to the torpid evolution (Figure 2). Doppler ultrasound reported: "total occlusive thrombosis of the external iliac vein, and the common, superficial and deep femoral veins; significant edema of subcutaneous cellular tissues, and arterial patency throughout." After the PCD diagnosis was confirmed, anticoagulant therapy was instituted.

Twenty-four hours after the episode blood perfusion improved significantly. The initial disorder was now coupled with a prominent volume increase in the lower limb, resulting from the venous and lymphatic stasis. The patient was moved for a postoperative radiological control (Figures 3 and 4).



Figure 2. Typical phlegmasia cerulea dolens image (30 minutes after surgery).

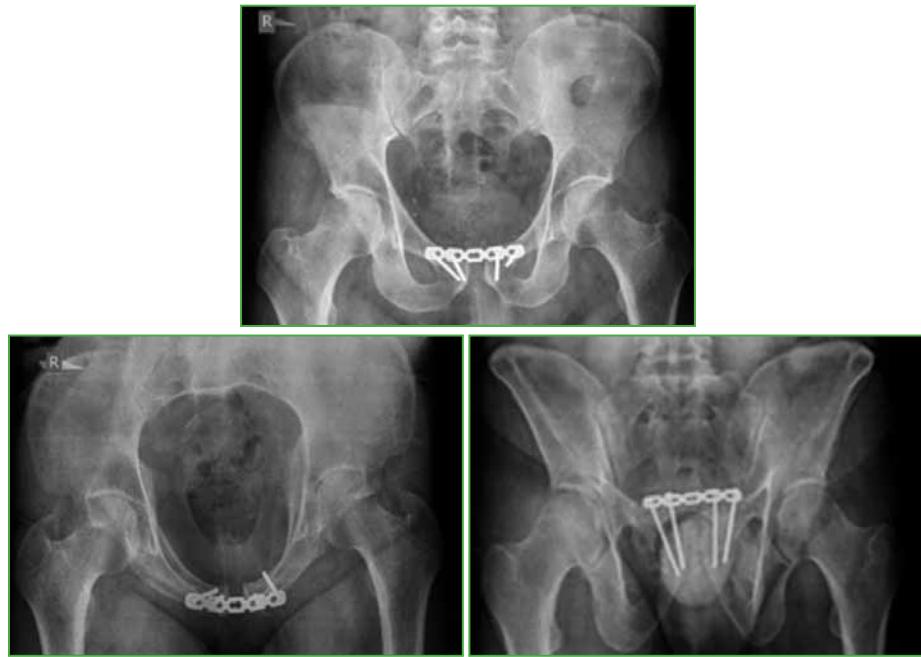


Figure 3. Postoperative radiologic assessment.



Figure 4. Follow-up control 24h after surgery.
There is clinical improvement after treatment.

The patient remained on anticoagulant therapy and had a favorable course. He was discharged 35 days after surgery, and was instructed to follow a preventive treatment for 6 months. The patient presented one complication, an increased amount of wound secretion, which was treated with surgical debridement during his hospitalization.

At day 120, during his orthopedic follow-up control, the patient had no clinical stigmata of PCD and completed his rehabilitation process walking unaided.

DISCUSSION

PCD has been reported in patients ranging from 7 to 86 years old; however, there is a higher PCD prevalence in patients from age 40 to 49 years, with a female:male ratio of 4:3.² Most clinical presentations are characterized by a sudden onset of pain (75% of cases), followed by edema and purple skin discoloration. More than 91% of patients have a history that includes DVT predisposing factors. PCD is estimated to develop most commonly in the left lower extremity, which is felt due to compression of the left iliac vein secondary to compression of the right iliac artery.

According to the Preventing Venous Thromboembolism Risk Classification Scheme, major trauma patients have a 40-80% thromboembolic risk,⁸ thus every patient from these groups must receive preventive treatment. However, there are no special guidelines for major trauma patients who also have other significant risk factors, as in the presented case.

According to statistics on venous thrombotic episodes, thrombi were detected in 58% of patients by Doppler ultrasound scan performed between day 7 and day 21,⁹ time-frame within which our patient was intervened. However, definitive treatment delay is associated with worse outcomes. Matta and Tornetta concluded that performing an open reduction and internal fixation for unstable pelvic ring injuries within 21 days from the time of injury is associated with a higher rate of excellent reductions than when performed after day 21 (70% vs. 55%).^{10,11}

CONCLUSIONS

The reported complication is an entity that has not yet been reported by the indexed publications from major biomedical search engines, which shows how little experience an orthopedic surgeon may have in this situation. The available literature reports that PCD patients have an amputation risk of 12-25% and a mortality rate close to 25%, with close to 30% of deaths due to pulmonary embolism. Our patient had a favorable course as a result of early diagnosis and adequate treatment. However, there are no clear guidelines for surgical interventions between day 7 and 21 in patients with unstable pelvic fracture and high thrombotic risk.

Conflict of interests: Authors claim they do not have any conflict of interests.

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