

## An unusual case of post-traumatic Perthes syndrome in adults

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### Abstract

Post-traumatic Perthes syndrome in adults is a rare manifestation. It poses a management problem and treatment is based on aggressive and directed management of the cardiopulmonary systems associated with rapid recognition and treatment of progressive lesions. The result differs depending on the duration, mechanism and severity of the compression, which justifies extreme caution in the approach to these patients. We report the observation of a rare case in a patient, with a history of DALY under treatment and hypertension poorly monitored under treatment, admitted to intensive care for Perthes syndrome resulting from serious thoraco-abdominal trauma following to a fall from a crane and whose clinical evolution was satisfactory. The objective is to emphasize the beneficial effects of early treatment of this rare syndrome in adults.

**Keywords:** Subcutaneous emphysema; Perthes; Respiratory distress; Post traumatic; Petechiae

### 1. Introduction

Perthes syndrome is defined by the association of subconjunctival hemorrhages, cervico-facial cyanosis and petechiae with neurological and cardio-respiratory manifestations. The brutal compression of the thorax or thoraco-abdominal blocked in forced inspiration with effort with a closed glottis is the mechanism responsible for the syndrome. Current treatment relies on urgent relief of chest compression, treatment of associated injuries, and cardiopulmonary resuscitation if necessary.

The clinic and imaging are specific to this condition. We report a serious case of Perthes syndrome resulting from an industrial accident. The objective of this article is to describe the clinical characteristics of Perthes syndrome in an adult victim of chest compression from a fall from a crane as well as the favorable evolution during his stay in intensive care.

### 2. Patient and observation

Mr. AB, aged 61, professional caretaker, with a history of hypertension under treatment (Amlodipine 10mg/day) with poor therapeutic compliance, right deep sylvian DALY in month 06/2019 under secondary prevention (aspirin 100mg/day and statin 40mg/d) presented with a picture of respiratory distress following trauma at the point of anterior thoracic impact by an accidental fall from a crane used for repairing the electricity network in the neighborhood where the patient was carrying out his work. The duration of post-fall compression was 8 minutes. When he arrived in the emergency room, he was conscious, polypneic at 28c/min saturating at 89% on ambient air, HR at 110 bpm with BP 14/08 very painful and agitated. Clinical examination reveals cyanotic purple craniofacial congestion with cervico-facial and subconjunctival hemorrhage and massive eyelid edema bilaterally with subcutaneous emphysema at the anterior thoracic level bilaterally affecting the upper limbs and the face [Figure 1].

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**Figure 1** Clinical appearance at patient admission: Cyanotic purple craniofacial congestion with cervicofacial and subconjunctival haemorrhage and massive bilateral eyelid edema with bilateral anterior subcutaneous emphysema reaching the upper extremities and face

The initial course of action was to provide the patient with oxygen therapy with VVP and carrying out a complete biological assessment and vascular filling. A thoraco-abdominal CT scan was carried out revealing a large mediastinal pneumo associated with cervico-facio-temporal emphysema reaching the level of the anterior thoracic region bilaterally, a small pneumothorax on the left, a hemothorax on the left, two foci of pulmonary contusions at the left upper lower lobar level, features of multiple fractures but not generating a costal flap [Figure 2,3,4].

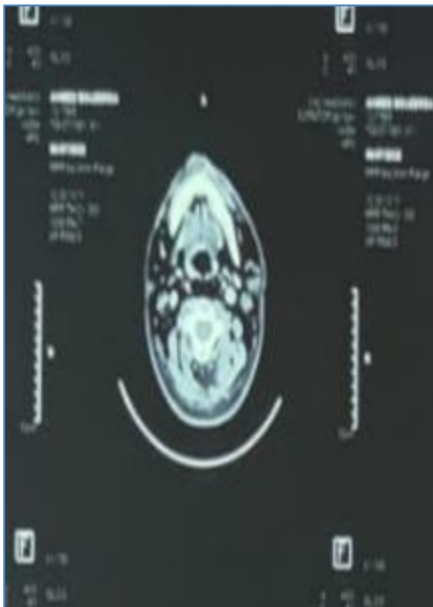


Figure 2

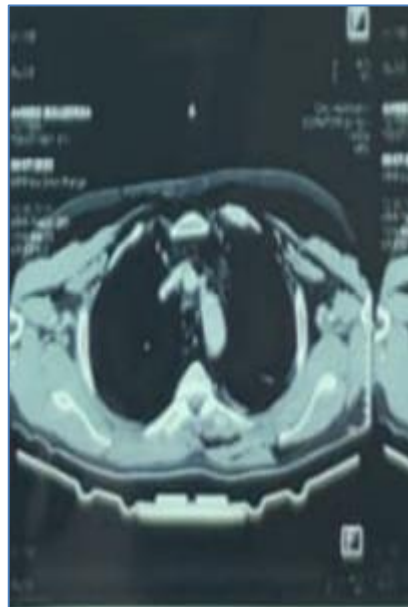


Figure 3

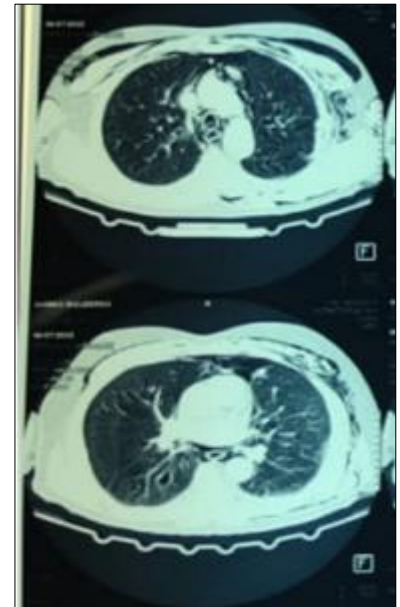


Figure 4

**Figure 2,3,4** Thoraco-abdominal CT scans showing a pneumo-mediastinum of great abundance flowing upwards towards the deep cervical spaces associated with emphysema at the level of the right bilateral and temporal jugal region reaching the level of the supraorbital region, a pneumothorax of low abundance on the left, a haemothorax on the left, two foci of pulmonary contusions at the level of the upper lower left lobar, fracture line at the level of the chondro-costal of the second left rib, fracture line at the level of the middle arch of the 3rd, 4th, 5th left rib not generating a costal flap with the presence of 2 pneumatocèle bubbles facing each other

Bronchoscopy was normal.

Biological examinations, in particular the rhabdomyolysis assessment; high income (CPK, CPKmb, LDH, Haptoglobin), blood count, hydro-electrolyte balance including serum potassium and renal function were normal [table 1]. In addition to these assessments, the patient had undergone ambient air gas testing upon admission to the department and found respiratory alkalosis pH = 7.48, paO<sub>2</sub> = 93, paCO<sub>2</sub> = 30, Bicarbonates = 23 SaO<sub>2</sub> = 96% (normal values pH = 7.38-7.42, paO<sub>2</sub>= 73-100mmHg, paCO<sub>2</sub>= 35-45mmHg, Bicarbonates: 22-28 mmol /l, SaO<sub>2</sub>= 95-100%).

**Table 1** Biological evolution of the patient

	On his admission	Day 5	Day 20
HB (14–18 g/dL)	9.7	9.5	10
GB (4-10x10 <sup>3</sup> /uL)	13520	10600	8900
PNN (2-7x 10 <sup>3</sup> )	11080	6980	3452
PLQ (150-400x10 <sup>3</sup> /uL)	242000	220000	230000
TP (70-100%)	100	100	100
TCA (27.6-38.4 S)	30	30	30
CRP (<6 mg/L)	27	73	23
PROCALCITONIN	0.05	0.04	1
CPK (0-171mg/L)	856	1287	213
CPKMB (0-35 mg/L)	342	432	38
LDH (0-248 IU/L)	407	876	123
HAPTOGLOBIN	-	-	-
TROPONIN us	1.2	0.08	0.001
UREA (0.17-0.43 mg/dL)	0.41	0.6	0.45
CREAT (8.1-14.4 mg/dL)	16	13	10
NATREMIA (135-145 mmol/L)	138	140	134
KALIEMI (3.5-4.5 mmol/L)	4.4	5	3.3
CHLOREMIA (98-106 mmol/L)	102	113	102
CALCIUM (88-108 mmol/L)	94	92	87
ALKALINE RESERVES (21-31 mmol/L)	16	23	28
MAGNESEMIA (18-26)	25	-	26
PHOSPHOREMIA (25-45)	45	-	-
PROTIDEMIC (66-83)	85	-	80

The care during his stay in intensive care focused on respiratory care (oxygen therapy with a mask at 6L/min, physiotherapy started on day 2 of his hospitalization), intravenous multimodal analgesia with paracetamol 1g/6h, Nefopam 100 mg/day IVSE and morphine 5 mg/6h subcutaneously.

The evolution was marked by a spectacular regression of the subcutaneous emphysema from day 2 of his hospitalization [Figure 5, table 1]. The total length of hospitalization was 7 days. The post-resuscitation consultation found a eupneic patient, with complete disappearance of the emphysema, autonomous.



**Figure\_5** Obvious clinical regression of bilateral eyelid edema and cervicofacial violet congestion

### 3. Discussion

Post-traumatic Perthes syndrome is a rare cause of respiratory distress in adults and its pathophysiology, including a sudden increase in the pressure of the superior vena cava during compressive thoracic trauma [1], [2], is currently well established, the therapeutic attitude remains well codified. Only 205 cases are reported [3], [4] and an incidence of one case for 18,500 accidents [5] mainly grouping together victims of car accidents (40%), other causes are distributed among road accidents, work, sporting accidents and crushing during gatherings or mass movements. [3], [6], [7]. Whatever the cause, a phenomenon of chest compression is always found. Thus the physiopathological mechanism deduced by Perthes seems in this sense, applicable whatever the etiology, particularly in our case; the victim perceives the beginning of the compressive force, which triggers a fear reaction of blocking the thorax in forced inspiration with the glottis closed at the time of thoracic impact [8] thus the compression increases the pressure in the superior vena cava causing venous reflux with rupture of the capillary venules in the drainage zone of the SVC [3], [4],[7]. The absence of such a phenomenon in dependent territories can be explained by the collapse of the inferior vena cava during the Valsalva maneuver. This would prevent the transmission of the increased venous pressure wave, protecting the dependent venous territory.

Neurological lesions are frequent and of different intensities (90%) and result in disturbances of consciousness leading to a deep coma [3], [4], [6], [9]. In our case, the neurological complications were minimal as shown by the Glasgow at 14-15 on admission, the satisfactory progression with a control brain scan at H4 was unremarkable although the frequency of neurological disorders contrasts with the rarity of the lesions. histological findings in the brain as found in the literature [4]. Usually, neurological manifestations disappear within 24 to 48 hours with early and appropriate treatment [9]. The excellent neurological outcome in our case can be explained by the short interval between the injury and the first life-saving aid provided as well as the absence of traumatic damage to his skull.

Cervico-facial cyanosis is found in 95%, cervico-facial petechiae in 84% and subconjunctival hemorrhage in 91% of the cases described [3], [8]. The presence of ophthalmological findings is almost constant. The severity of these ophthalmological signs is proportional to the duration and intensity of chest compression. [4]

In our case, the combination of bilateral orbital floor fractures, fractures of the nasal bones and conjunctival hemorrhages required planned surgical treatment after release from the intensive care unit. In addition, non-specific thoracic lesions have been described [3], [4]. These injuries can include pulmonary contusion, rib fractures like the case of our patient, [3], [10] hemopneumothorax or diaphragmatic rupture [6], [8]. Management remains difficult with the presence of progressive lesions which could increase care and lengthen the stay in intensive care.

Myocardial contusions are rare [10]. Our patient's transthoracic echocardiogram was normal.

Thus, the prognosis of Perthes syndrome remains variable: Chest compression greater than 10 minutes, the presence of several serious or progressive lesions remain the predictive criteria for a poor prognosis in most studies. In our example of Perthes syndrome, moderate damage secondary to trauma associated with a rapid start of cardiorespiratory treatment was responsible for a good clinical course and a good prognosis.

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#### 4. Conclusion

Perthes syndrome should be considered in any adult patient presenting the association of an ecchymotic mask with petechial skin hemorrhages and subconjunctival hemorrhages as a complication of chest compression. The progression varies depending on the severity and duration of the compression as well as the speed of treatment, thus determining the patient's prognosis.

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#### Compliance with ethical standards

##### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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