

Traumatic asphyxia with a “masque ecchymotique” in a 14-year-old adolescent

✉ Nihan Şık, M.D.,¹ ✉ Oğuzhan Başerdem, M.D.,² ✉ Murat Duman, M.D.,¹ ✉ Durgül Yılmaz, M.D.¹

¹Division of Pediatric Emergency Care, Department of Pediatrics, Dokuz Eylül University Faculty of Medicine, İzmir-Türkiye

²Department of Pediatrics, Dokuz Eylül University Faculty of Medicine, İzmir-Türkiye

ABSTRACT

Traumatic asphyxia, which is manifested by facial edema, cyanosis, subconjunctival hemorrhage, and petechiae on the upper chest and abdomen, is a very rare clinical syndrome in children. In adults, the incidence of traumatic asphyxia was reported as 1 case/18,500 accidents, but the actual incidence is not known for pediatric population. Traumatic asphyxia is a mechanical cause of hypoxia resulting from sudden compression of the thoracic-abdominal region and the valsalva maneuver is necessary for the development of this syndrome. Here, we describe a case of traumatic asphyxia with an ecchymotic mask in a 14-year-old boy who was referred to our pediatric emergency department.

Keywords: Asphyxia; child; ecchymosis; trauma.

INTRODUCTION

Traumatic asphyxia, which is manifested by facial edema, cyanosis, subconjunctival hemorrhage, and petechiae on the upper chest and abdomen, is a very rare clinical syndrome in children.^[1,2] It is caused by sudden compressive blunt chest and/or abdomen trauma.^[2,3] After the trauma, there are multiple petechiae on the face and neck regions, which subsequently cause the faces of these patients to appear livid.^[3] The term “masque ecchymotique” or “ecchymotic mask” is also used for the description of this entity.^[2] Here, we describe a case of traumatic asphyxia who was referred to our pediatric emergency department.

CASE REPORT

A previously healthy 14-year-old boy was transferred from a regional medical center after trauma. He had fallen from a tractor and became stuck between the tractor and the trailer. He was conscious, cooperative, and oriented with a Glasgow coma scale score of 15. He had a heart rate of 109 beats/

min, respiratory rate of 22 breaths/min, and blood pressure of 118/73 mmHg. Oxygen saturation and body temperature were within the normal limits. On physical examination, there was cyanosis on the face and diffuse petechiae on the face, head, and neck (Fig. 1). The face and both eyelids were edematous and there was bilateral subconjunctival hemorrhage (Figs. 1 and 2). The airway was intact with no evidence of respiratory distress and bilateral lung auscultation was normal. There was tenderness and limitation of movement in the right and left shoulders and elbows, in the right wrist, in the right hip and knee, and in the right and left ankle and foot. Cervical, thoracic, lumbar spinous processes, and pelvic examination also revealed tenderness. There was no other pathological physical examination finding. In the medical history, he had fallen from a height 2 years previously and developed epidural hematoma, so he was operated and was discharged without any complications. Otherwise, his medical history and family history were unremarkable for coagulopathies or any other diseases.

On laboratory evaluation, he had a white blood cell count of 18,200/ μ L and a platelet count of 192,000/ μ L. The hemoglo-

Cite this article as: Şık N, Başerdem O, Duman M, Yılmaz D. Traumatic asphyxia with a “masque ecchymotique” in a 14-year-old adolescent. *Ulus Travma Acil Cerrahi Derg* 2023;29:00-00

Address for correspondence: Nihan Şık, M.D.

Dokuz Eylül Üniversitesi Tıp Fakültesi, Çocuk Sağlığı ve Hastalıkları Anabilim Dalı, Çocuk Acil Bilim Dalı, İzmir, Türkiye

Tel: +90 232 - 412 60 21 E-mail: drnihan87@hotmail.com

Ulus Travma Acil Cerrahi Derg 2023;29(4):543-545 DOI: 10.14744/tjtes.2022.53099 Submitted: 28.12.2021 Revised: 19.03.2022 Accepted: 10.05.2022

OPEN ACCESS This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).



bin level was 13.8 g/dL. The prothrombin time and activated partial thromboplastin time were 12.3 and 22.4 s with an international normalized ratio of 1.0; the fibrinogen and D-dimer levels were 3.1 mg/dL and >33.9 µg/mL. The creatine kinase (CK) level was 9755 U/L and had increased to 14,084 U/L after 12 h. Other biochemical parameters and blood gas parameters were within normal limits. Urine myoglobin level was 617.2 ng/mL with a pH of 5.0.

Head, neck, thorax, and abdominopelvic computed tomography (CT) and X-ray images of the four extremities were obtained. Radiologic investigations revealed slightly displaced fractures in the left 4th, 5th, 7th, and 11th ribs and a non-displaced fracture in the right scapula, millimetric pneumothorax in both hemithoraxes, and contusion on the basal segments of the lower lobe of the left lung. There were fractures with collapse in the L1 and L2 vertebral corpuses, which caused <20% loss of height, but no protrusion into the spinal canal or into the anterior epidural space was observed. There were also fractures in the right medial malleolus, 5th metatarsal and navicular bones, and left ramus pubis inferior.



Figure 1. Patient with multiple petechiae and cyanosis on the face and neck with facial edema.

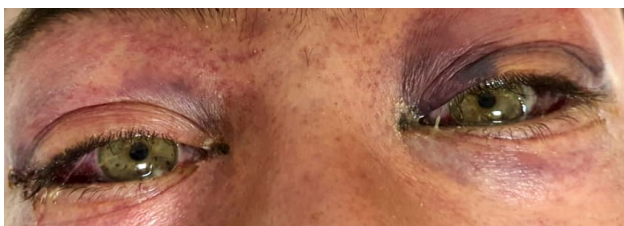


Figure 2. Bilateral edema and multiple petechiae on the eyelids and subconjunctival hemorrhage.

Oxygen was supplied by a simple face mask with a flow of 5 L/min. A urinary catheter was inserted to strictly monitor urine output. A total of 3000 mL/m²/day of 0.9% NaCl 5% dextrose infusion and 100 mEq/m²/day of NaHCO₃ therapy was started. NaHCO₃ therapy was continued for 24 h, until having obtained a urine pH of 8.0. At the same time, there was a decrease in CK levels and urine myoglobin. He was admitted to the ward of the orthopedics and traumatology department, and on the 4th day, he was operated due to the fracture in the medial malleolus. There was no need for chest tube placement for pneumothorax or any need for operation for other injuries. On the 7th day of admission, he was discharged without any complications. Informed consent was received from his parents.

DISCUSSION

The most common clinical presentation of traumatic asphyxia is facial edema, cyanosis, subconjunctival hemorrhage, and petechiae on the face, neck, and upper chest regions.^[2] Additional ophthalmologic findings may include exophthalmos, proptosis, or transient visual changes, which were not observed in our patient.^[1,4]

Traumatic asphyxia is a mechanical cause of hypoxia resulting from sudden compression of the thoracic-abdominal region and the Valsalva maneuver is necessary for the development of this syndrome.^[4,5] Other causes are episodes of asthma, paroxysmal coughing, seizures, persistent vomiting, and jugular venous occlusion.^[1] In adults, the incidence of traumatic asphyxia was reported as one case/18,500 accidents; although being very rare, the actual incidence is not known in the pediatric population.^[3,6]

The main mechanism is the attack of blood from the right atrium to the valveless innominate and jugular veins in the head and neck regions caused by positive pressure in the mediastinum due to blunt trauma to the thorax and/or upper abdomen. Due to the sudden increased pressure in the vein bed, there is an occurrence of small hemorrhage as petechiae. Petechiae do not seem to occur in the lower part of the body because the valves of the lower extremity veins control the increased venous pressure. Another explanation is that increased airway pressure can protect the lower part of the body when the inferior vena cava is compressed.^[7-10]

Even though the ecchymotic mask is a very dominant and horrific symptom, it usually resolves with conservative management. This may mask other critical injuries due to the trauma. Rib fractures, lung contusions, hemothorax, pneumothorax, flail chest, solid organ lacerations, and neurological sequelae may also occur based on the severity of the trauma.^[3-7] Accordingly, our patient also had lung contusion, pneumothorax, and multiple fractures in the ribs, vertebrae, pelvis, and extremities. In adult cases, Dunne et al.^[6] recommended obtaining CT scans of the head, abdomen, and

pelvis together with ultrasound of the venous system of the neck and upper extremities and an echocardiogram. However, there is no specific recommendation for the pediatric population in the literature.^[2,3] Given the anatomical and physiological differences between pediatric and adult cases, it may not be necessary to perform all of these investigations for children.^[2] Pediatric patients should be examined thoroughly and necessary examinations and treatments should be planned accordingly. As differential diagnoses, superior vena cava syndrome, skull base fractures, and conjunctival hemorrhage should be considered in terms of suspected findings.^[1,9]

The treatment strategy usually includes conservative management. The head of the bed can be elevated by 30° and oxygen can be supplied to reduce the intracranial pressure in uncomplicated cases. Patients who have additional complicated organ injuries should undergo advanced trauma life support steps, administration of cervical spinal immobilization, and treatment of hemorrhage/hypotension according to the clinical status of the case.^[2-8] There is also no clear recommendation regarding the follow-up period of these cases. It seems sensible to determine the follow-up period for each patient individually because the clinical course will depend on the severity of trauma and accompanying injuries.^[1,2] The physical signs are generally self-limited and resolve over a period of several weeks.^[4] The prognosis is usually good in these patients. It was reported that patients who survived the initial injury for more than 1 h had a 90% rate of survival.^[11,12] The duration of compression was reported to be between 2 and 5 min in the literature.^[10,11] The severity and duration of compression and accompanying injuries determine the prognosis; prolonged thoracic compression may lead to cerebral anoxia and neurological complications.^[2-5] Initial neurological examination and cranial CT results of our patient were normal and he was discharged without any complications, respectively.

Conclusion

The ecchymotic mask caused by traumatic asphyxia has a dramatic presentation and requires careful management in the pediatric emergency department. Accompanying injuries should be vigilantly investigated and treated to improve outcomes. Most patients have a good prognosis and can antici-

pate a full recovery.

Informed Consent: Written informed consent was obtained from the patient's family for the publication of the case report and the accompanying images.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: N.Ş., O.B., M.D., D.Y.; Design: N.Ş., O.B., M.D., D.Y.; Supervision: M.D.; Resource: D.Y.; Materials: N.Ş.; Data: O.B.; Analysis: D.Y.; Literature search: N.Ş.; Writing: N.Ş.; Critical revision: D.Y.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study has received no financial support.

REFERENCES

- Montes-Tapia F, Barreto-Arroyo I, Cura-Esquivel I, Rodríguez-Taméz A, de la O-Cavazos M. Traumatic asphyxia. *Pediatr Emerg Care* 2014;30:114-6. [CrossRef]
- Güleriş OD, Akar T, Atmaca YM. Four traumatic asphyxial cases with an "masque ecchymotique" in pediatric emergency department. *J Pediatr Emerg Intensive Care Med* 2020;7:92-6. [CrossRef]
- Nishiyama T, Hanaoka K. A traumatic asphyxia in a child. *Can J Anaesth* 2000;47:1099-102. [CrossRef]
- Campbell-Hewson G, Egleston CV, Cope AR. Traumatic asphyxia in children. *J Accid Emerg Med* 1997;14:47-9. [CrossRef]
- Lee MC, Wong SS, Chu JJ, Chang JP, Lin PJ, Shieh MJ, et al. Traumatic asphyxia. *Ann Thorac Surg* 1991;51:86-8. [CrossRef]
- Dunne JR, Shaked G, Golocovsky M. Traumatic asphyxia: An indicator of potentially severe injury in trauma. *Injury* 1996;27:746-9. [CrossRef]
- Byard RW, Hanson KA, James RA. Fatal unintentional traumatic asphyxia in childhood. *J Paediatr Child Health* 2003;39:31-2. [CrossRef]
- Lateef H. Traumatic asphyxia with diaphragmatic injury: A case report. *Oman Med J* 2015;30:142-5. [CrossRef]
- El Koraichi A, Benafitou R, Tadili J, Rafi M, El Kharaz H, Al Haddoury M, et al. Traumatic asphyxia or Perthes syndrome. About two paediatric cases. *Ann Fr Anesth Reanim* 2012;31:259-61. [CrossRef]
- Gorenstein L, Blair GK, Shandling B. The prognosis of traumatic asphyxia in childhood. *J Pediatr Surg* 1986;21:753-6. [CrossRef]
- Şenoğlu M, Şenoğlu N, Öksüz H, İspir G. Perthes syndrome associated with intramedullary spinal cord hemorrhage in a 4-year-old child: A case report. *Cases J* 2008;1:17. [CrossRef]
- Hurtado TR, Della-Giustina DA. Traumatic asphyxia in a 6-year-old boy. *Pediatr Emerg Care* 2003;19:167-8. [CrossRef]

OLGU SUNUMU - ÖZ

On dört yaşındaki adolesan olguda travmatik asfiksiye bağlı ekimoz maskesi

Dr. Nihan Şık,¹ Dr. Oğuzhan Başerdem,² Dr. Murat Duman,¹ Dr. Durgül Yılmaz¹

¹Dokuz Eylül Üniversitesi Tıp Fakültesi, Çocuk Sağlığı ve Hastalıkları Anabilim Dalı, Çocuk Acil Bilim Dalı, İzmir

²Dokuz Eylül Üniversitesi Tıp Fakültesi, Çocuk Sağlığı ve Hastalıkları Anabilim Dalı, İzmir

Travmatik asfiksi, yüzde ödem, siyanoz, subkonjonktival kanama ve göğsün üst bölümü, boyun ve yüzde peteşiler ile karakterize olup çocuklarda çok nadir görülen bir klinik sendromdur. Erişkinlerdeki insidansı 1/18,500 olarak rapor edilmiştir ancak çocuklardaki oran tam olarak bilinmemektedir. Travmatik asfiksi, torako-abdominal bölgedeki ani kompresyona bağlı mekanik hipoksinin sonucu olup bu sendromun ortaya çıkması için Valsalva manevrası gereklidir. Bu yazıda, ekimoz maskesi görünümü olan 14 yaşındaki travmatik asfiksi olgusu sunuldu.

Anahtar sözcükler: Asfiksi; çocuk; ekimoz; travma.

Ulus Travma Acil Cerrahi Derg 2023;29(4):543-545 doi: 10.14744/tjtes.2022.53099