NEW METHOD DIFFUSE ALVEOLAR HEMORRHAGE SECONDARY TO FAT EMBOLISM AFTER LONG BONE FRACTURE

Yusupov Murod
Boymanov Farkhod
Samarkand State Medical University

INTRODUCTION

Fat embolism syndrome (FES) is a known complication of long bone fractures. While hypoxemia is a common presenting symptom of FES, diffuse alveolar hemorrhage (DAH) is a rare complication of the condition with similar imaging characteristics on chest radiograph. This case describes a young, healthy male who developed hypoxemic respiratory failure and hemoptysis from diffuse alveolar hemorrhage secondary to fat embolism after a femoral fracture.

Case presentation A previously healthy 18 year old male presented to the Emergency Room after a motorcycle collision. Initial vital signs were notable for normal temperature, heart rate 98, blood pressure 124/69, oxygen saturation 100% on room air. Imaging showed a right femoral fracture (Fig. 1). Initial CXR was unremarkable (Fig. 2). One day after admission, he developed tachycardia and new hypoxia with a 6L O2 requirement. CXR that day showed new infiltrates (Fig. 3). CT angiography of the chest was negative for pulmonary embolism but notable for extensive ground glass opacities throughout the lung parenchyma with patchy consolidations and areas of crazy paving (Fig. 4). Two days after admission, he underwent right femoral intramedullary nailing. His oxygenation improved; however, later he developed scant bright red hemoptysis. Vital signs were notable for normal temperature, pulse 108, blood pressure 101/56, oxygen saturation 94% on 2L nasal cannula. On physical exam, he was found to be in no acute distress. Pulmonary exam was notable for rhonchi in the bases. No rashes or synovitis were identified. His right thigh was dressed but exam distal to the dressing was unremarkable. Laboratory tests revealed normal chemistries, a normal white blood cell count, hemoglobin of 11.2, and platelets 119. Subsequent CXR showed worsening of his infiltrates. Bronchoscopy with bronchoalveolar lavage was performed, with progressively bloody aliquots (Fig. 5). BAL cultures were negative for bacterial and fungal pathogens. Connective tissue serologies were negative. Cytology from the BAL was notable for abundant lipid-laden macrophages by Oil-red-O stain (see Fig. 6). He was started on methylprednisolone and albumin with significant improvement in his radiographic findings.

Discussion FES occurs as a complication of trauma and orthopedic injuries, but it can also be seen in atraumatic conditions such as bone marrow transplantation, liver injury, and administration of exogenous fat [1]. The clinical incidence is 1–3% with single long bone fractures [2,3]. Intramedullary nailing of long bones is among the most common surgical procedures that lead to FES [3]. The classic triad of symptoms includes hypoxemia, petechial rash, and neurologic dysfunction. Average latency between insult and onset of symptoms was 4 hours–15 days in a review of 100 cases [4]. Up to 75% of patients with FES present with respiratory failure to varying degrees [2]. FES is primarily a diagnosis of exclusion. Multiple criteria exist to aid in diagnosis (Table 1) [4–6]. Typical imaging findings on CT chest include bilateral, patchy, well-demarcated ground glass opacities in a non-dependent distribution. Less common findings include crazy paving, lobular consolidation, and nodular septal thickening. These findings are similar to what is seen in diffuse alveolar hemorrhage [7]. The radiographic differential for FES-DAH includes lung contusion, pulmonary edema, aspiration, and DAH from other causes. Fat droplets within cells on bronchoalveolar lavage can be helpful, but is a non-specific finding [7]. DAH is a rare complication of FES. There are approximately 11 reported cases in the literature, which are largely associated with traumatic orthopedic injuries [2]. The exact mechanism by which FES causes DAH is unclear; one theory is that lipoprotein lipase acts on capillary fat, resulting in free fatty acids that induce chemokine-derived cell infiltration leading to damage of the alveolar-capillary membrane [8]. Treatment is largely supportive. Albumin administration has been shown to be helpful, presumably because of its ability to bind free fatty acids [1,2]. Steroid use has also been reported [5,9]. Despite its rarity, physicians should consider FES-DAH as a cause of hemoptysis after long bone fracture, especially as it may have implications for anticoagulation protocols in the post-operative period [10]. Fortunately, prognosis is generally good. Our patient met criteria Lindeque's criteria for FES even prior to his intramedullary nailing; he may have met the other criteria as well if arterial blood gas data had been available. After initiation of steroids and albumin, he had rapid improvement in his chest radiograph and was discharged on room air. He had no pulmonary complaints at his orthopedic follow up appointment 6 weeks later.

REFERANCE:

1. КИМ А. А., ИНДИАМИНОВ С. И., ШОЙИМОВ Ш. У. СТАТИСТИЧЕСКИЙ АНАЛИЗ ПОВРЕЖДЕНИЙ У ДЕТЕЙ-ПЕШЕХОДОВ ПРИ АВТОМОБИЛЬНЫХ ТРАВМАХ //T [a_XW [i [S US S_S^[ùe YfcS^. – С. 215.

2. Xolboyevich B. F., Indiaminivich I. S. THE ROLE OF DESIGN FEATURES OF UZBEK NATIONAL KNIVES-“PICHAK” IN THE TASK OF FORENSIC MEDICAL EXAMINATION //European science review. – 2017. – №. 7-8. – С. 25-26.

3. BOYMANOV F. X., INDIAMINOV S. I. THE ROLE OF DESIGN FEATURES OF UZBEK NATIONAL KNIVES-“PICHAK” IN THE TASK OF FORENSIC MEDICAL EXAMINATION //EUROPEAN SCIENCE REVIEW. – С. 25-26.

4. Бойманов Ф. Х. СУДЕБНО-МЕДИЦИНСКАЯ ОЦЕНКА МЕХАНИЧЕСКИХ ПОВРЕЖДЕНИЙ НОСА //Молодежь и медицинская наука в XXI веке. – 2014. – С. 111-112.

5. Rasulova M. R., Indiaminov S. I. Судебно-медицинская характеристика повреждений органов слуха //Здобутки клінічної і експериментальної медицини. – №. 2. – С. 145-148.

6. Бойманов Ф. Х., Гамидов С. Ш. ОСОБЕННОСТИ ПЕРЕЛОМОВ КОСТЕЙ НИЖНИХ КОНЕЧНОСТЕЙ У ПОСТРАДАВШИХ ПЕШЕХОДОВ ПРИ АВТОМОБИЛЬНОЙ ТРАВМЫ //The 11th International scientific and practical conference “Topical issues of the development of modern science”(July 1-3, 2020) Publishing House “ACCENT”, Sofia, Bulgaria. 2020. 256 p. – 2020. – С. 74.

7. Indiaminov S. I., Abdumuminov K. N., Boymanov F. K. Characteristics of injuries in cyclists injured when other vehicles collide with the side of the body of moving bicycles //Russian Journal of Forensic Medicine. – 2022. – Т. 8. – №. 4. – С. 57-65.

8. Бойманов Ф. Х., Кушбаков А. М., Азимов К. И. Особенности Строения Узбекских Национальных Ножей-Пичак //Central Asian Journal of Medical and Natural Science. – 2023. – Т. 4. – №. 2. – С. 532-535.

9. Эшбеков М. А., Бойманов Ф. Х. ИММУНОКОМПЛЕСНЫЕ МЕХАНИЗМЫ В ТЕЧЕНИИ ХРОНИЧЕСКОГО ГЛОМЕРУЛОНЕФРИТА //International Bulletin of Applied Science and Technology. – 2023. – Т. 3. – №. 4. – С. 847-851.

10. Шамсиев А. М. и др. МАЛОИНВАЗИВНЫЙ МЕТОД ХИРУРГИЧЕСКОГО ЛЕЧЕНИЯ ЭХИНОКОККОЗ ЛЕГКИХ //Наука и инновация. – 2023. – Т. 1. – №. 3. – С. 79-81.

11. Хамдамов Б. З., Бойманов Ф. Х., Кулиев Ш. Э. ПОВРЕЖДЕНИЙ СВЯЗОЧНЫХ СТРУКТУР СУСТАВОВ //Наука и инновация. – 2023. – Т. 1. – №. 4. – С. 59-64.

12. Хамдамов Б. З., Бойманов Ф. Х., Кулиев Ш. Э. ПОВРЕЖДЕНИЙ СВЯЗОЧНЫХ СТРУКТУР СУСТАВОВ //Наука и инновация. – 2023. – Т. 1. – №. 4. – С. 59-64.

13. Напасов И. З., Хамдамов Б. З., Бойманов Ф. Х. ОСОБЕННОСТИ ПОВРЕЖДЕНИЙ СВЯЗОЧНЫХ СТРУКТУР СУСТАВОВ //Наука и инновация. – 2023. – Т. 1. – №. 4. – С. 36-42.

14. Erkinovna D. A. et al. КЛАССИФИКАЦИИ МЕХАНИЧЕСКИХ ТРАВМ ОРГАНА ЗРЕНИЯ //JOURNAL OF BIOMEDICINE AND PRACTICE. – 2023. – Т. 8. – №. 1.

15. Eshbekov M. A., Boymanov F. X. THE SIGNIFICANCE OF IMMUNOCOMPLEX MECHANISMS DURING CHRONIC GLOMERULONEPHRITIS //Наука и инновация. – 2023. – Т. 1. – №. 4. – С. 74-77.

16. Indiaminovich I. S. et al. FEATURES OF DAMAGES OF THE SPINE AND SPINAL STRUCTURES IN VARIOUS MECHANICAL INJURIES //JOURNAL OF BIOMEDICINE AND PRACTICE. – 2023. – Т. 8. – №. 2.

17. Boymanov F. K., Kushbakov A. M., Rashidov F. F. Morphological features of stab–cut wounds of the skin of the trunk and limbs inflicted by kitchen knives //Reports of Morphology. – 2023. – Т. 29. – №. 2. – С. 32-37.

18. Indiaminov S. I., Boymanov F. H. Морфологія колото-різаних ран серця, завданих національними узбецькими ножами //Шпитальна хірургія. Журнал імені ЛЯ Ковальчука. – №. 1. – С. 93-96.