A Case of Lung Lesions Induced by a Soccer Ball

Masaaki Takemoto, Youichi Yanagawa, Tsubasa Oike, Toshiaki Iba and Hiroshi Tanaka

Department of Emergency and Disaster Medicine, Juntendo University, Tokyo, Japan.
Corresponding author email: mitootake@juntendo-urayasu.jp

Abstract: An 18-year-old youth soccer forward received a direct hit from a kicked soccer ball on the anterior right chest when the goal keeper kicked the ball from a distance of 1 meter. Immediately following the hit, the subject experienced dyspnea, chest pain and had a cough, with several milliliters of hemoptysis. His symptoms subsided after 20 minutes of rest. However, he still felt mild discomfort and was taken to our department for evaluation. On examination, all vital signs were normal. A computed tomography scan of the chest was obtained, and revealed a small area of opacification in the right lung field suggesting a pulmonary contusion or traumatic lung edema. Ten days after the initial injury, he was cleared for full participation. We herein reported the first case of a lung lesion induced by a soccer ball. Conservative treatment resulted in a favorable outcome.

Keywords: soccer ball, lung contusion, lung edema, conservative therapy, weak energy sports accident

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Introduction
Clinical manifestations of pulmonary contusions can present acutely or over several hours following injury, with dyspnea and hypoxemia being the most commonly reported findings, although tachypnea, hemoptysis, chest pain, or wheezing may also occur.\textsuperscript{1,2} Blunt chest trauma is the most common cause of a pulmonary contusion, and approximately 90% of the injuries are the result of motor vehicle crashes, followed by falls.\textsuperscript{1,2} The development of a pulmonary contusion from participating in a sport is a rarely reported event. We herein report the first case of a lung contusion induced by a soccer ball.

Case Report
An 18-year-old youth soccer forward with asthma attacked the goal keeper during a game. He received a direct hit from a kicked soccer ball on the anterior right chest when the goal keeper kicked the ball from a distance of 1 meter. Immediately following the hit, the subjects experienced dyspnea, chest pain and had a cough, with several milliliters of hemoptysis. His symptoms subsided after 20 minutes of rest. However, he still felt mild discomfort and was removed from the game and taken to our department for evaluation. On examination, all vital signs were normal. His $\text{SpO}_2$ on room air was 98%. Pulmonary auscultation revealed bilaterally clear breath sounds with good air entry and no pain with deep inspiration. A computed tomography (CT) scan of the chest was obtained, and revealed a small area of opacification in the right lung field suggesting a pulmonary contusion or traumatic lung edema (Fig. 1). The athlete remained asymptomatic and returned to noncontact practice 7 days after the injury. 10 days after the initial injury, he was cleared for full participation, and he competed in the next game.

Discussion
Pulmonary contusions during sports have been reported to occur following skier-tree collisions, diving platform falls, a fall from a horse during a polo game, and tackle injury during a rugby game.\textsuperscript{3-8} The skier-tree collisions, diving platform falls and fall from the horse during a polo game were high energy accidents created by gravity or horsepower. These events are similar to an automobile accident in terms of the level of energy, so it is not surprising that such pulmonary contusions have been observed. In contrast, the rugby injury was a contact injury due to human power, so it is thought that such an accident would be rare and that the severity of the pulmonary contusion should be mild, as in our present case. The present subject belonged to a semi-professional soccer team, where the players have a high kick energy in comparison with amateurs, and this patient received a soccer ball blow to the chest following a kick at point-blank range. Thus, so it was not surprising that this extremely rare pulmonary contusion occurred. Since the patient is of a younger age, the elasticity of the chest wall may relevant to the mechanism of injury. There is no evidence that the subject’s asthma was associated with the risk of developing the contusion. Conservative therapy resulted in a favorable outcome for the isolated pulmonary lesion resulting from a weak energy sports accident. As a transient malfunction of the blood-gas barrier in the alveoli induced by blunt trauma might lead to the generation of lung edema, and such lesions are resolved rapidly, it is likely that the present case was due to lung edema.

Conclusion
We herein reported the first case of a lung lesion induced by a soccer ball. Conservative treatment resulted in a favorable outcome.

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Lung lesions induced by a soccer ball

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Wrote the first draft of the manuscript: MT. Contributed to the writing of the manuscript: TO. Agree with manuscript results and conclusions: YY. Jointly developed the structure and arguments for the paper: TI. Made critical revisions and approved final version: HT. All authors reviewed and approved of the final manuscript.

Disclosures and Ethics
As a requirement of publication the authors have provided signed confirmation of their compliance with ethical and legal obligations including but not limited to compliance with ICMJE authorship and competing interests guidelines, that the article is neither under consideration for publication nor published elsewhere, of their compliance with legal and ethical guidelines concerning human and animal research participants (if applicable), and that permission has been obtained for reproduction of any copyrighted material. This article was subject to blind, independent, expert peer review. The reviewers reported no competing interests.

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