A 16-year-old boy experienced a sudden loss of consciousness. On arrival, he was in cardiac arrest with pulseless electrical activity. An ultrasound study revealed a high-echoic layer surrounding the heart. He received a diagnosis of clotting cardiac tamponade. Urgent thoracotomy with pericardiotomy was performed, but he failed to obtain return of spontaneous circulation. Physicians should focus on not only low-echoic but also high-echoic areas to accurately diagnose clotting, which can result in a critical condition if not managed properly.

Abstract

Keywords
- aortic dissection
- tamponade
- Loeys–Dietz syndrome

A 16-year-old boy experienced a sudden loss of consciousness. On arrival, he was in cardiac arrest with pulseless electrical activity. An ultrasound study revealed a high-echoic layer surrounding the heart. He received a diagnosis of clotting cardiac tamponade. Urgent thoracotomy with pericardiotomy was performed (Fig. 3), but he failed to obtain return of spontaneous circulation. Autopsy imaging indicated residual pericardiac hematoma (Fig. 4). Based on his features, he was suspected of having Loeys–Dietz or Marfan syndrome. We postulated that connective tissue disease had induced Type A aortic dissection with subsequent rupture that had resulted in cardiac tamponade and cardiac arrest.

Fig. 1 The ultrasound study revealed a high-echoic layer (arrow) surrounding the heart (arrowheads) suggesting clotting cardiac tamponade.

Fig. 2 The ultrasound study revealed a high-echoic layer (arrow) surrounding the ascending aorta, suggesting aortic dissection.

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Permission to perform a genetic analysis was not obtained from his parents.

In cases of hemorrhaging into a closed space, the blood forms a blood clot to achieve hemostasis. During this process, the whole blood separates into a blood clot and serum. When the serum accumulates in one space, it may be detected as fluid by ultrasound. However, it takes some time for the serum to accumulate. Accordingly, a focused assessment with sonography in trauma, which focuses on low-echoic areas to detect serum, is well known to have a high false-negative rate for the acute hemorrhaging state in traumatized patients. Clots are scanned as high-echoic areas on ultrasound studies. If physicians focus not only on low-echoic but also high-echoic areas, the sensitivity for detecting clinically significant blood clots in the human body may be improved.

Unfortunately, the present patient failed to obtain a favorable outcome; however, the urgent resolution of cardiac tamponade by clotting and subsequent treatments might result in a favorable outcome in other patients.

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Conflict of Interest
The authors declare no conflict of interest related to this article.

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