

Penetration of screw into the wall of thoracic aorta after stabilization of thoracic spine – case report

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Summary

In our research we have discussed a rare case of penetration of screw into the thoracic aorta after stabilization of thoracic spine due to compressive fracture of IV thoracic vertebra. We have focused on existence of potential danger of damage of aorta during stabilization of the posterior part of thoracic spine. We have emphasized the meaning of prophylactic implantation of stent-graft into the site of potential damage of aorta before the restabilization of the vertebral column.

Key words: vascular complications, damage of aorta, posterior stabilization of the vertebral column, stent-graft

Penetracja śruby w ścianę aorty piersiowej po stabilizacji kręgosłupa piersiowego – opis przypadku

Streszczenie

Przedstawiono rzadki przypadek penetracji śruby w ścianę aorty piersiowej po stabilizacji kręgosłupa piersiowego po złamaniu kompresyjnym IV kręgu piersiowego. Zwrócono uwagę na istnienie potencjalnego niebezpieczeństwa uszkodzenia aorty podczas stabilizacji tylnej kręgosłupa piersiowego. Podkreślono znaczenie profilaktycznego wszczęcia stent-graftu w miejsce potencjalnego uszkodzenia aorty przed restabilizacją kręgosłupa.

Słowa kluczowe: powikłania naczyniowe, uszkodzenie aorty, stabilizacja tylna kręgosłupa, *stent-graft*

An iatrogenic damage of aortic wall after stabilization of the vertebral column is a very rare, but dangerous complication [8, 9]. Our study discusses a case of a patient, who went through penetration of one of the screws to the aortic wall, after stabilization of thoracic spine. The aim of this research is to enlighten the potential danger of injury of a big vessel during posterior stabilization of thoracic vertebra.

Case

N.N., a 28-years-old patient transported by helicopter to our Clinic due to multiorgan injury resulting from traffic accident. Except pneumothorax, caused by fracture of IV and V rib on the left side and head injury, the patient had also paralysis of both inferior limbs due to compression fracture of VTh4. Because of patient's severe condition, clinical and radiological features of total damage of the spinal cord, we have decided to carry out the posterior stabilization of the vertebral column, VTh3-VTh5 (Legacy).

After the operation the patient was transferred to the Intensive Care Unit, and after improvement of the general condition he was transferred back to the Clinic on the 5th postoperative day.

Since the second week after the operation the patient had been tilted. During the rehabilitation period the patient complained about the chest pains. The chest X-ray revealed the presence of fluid in pleura. We had drained the pleura and continued the rehabilitation.

During the 6-weeks-lasting rehabilitation period the patient complained about the chest pains of the left side, which was thought to be a result of chest injury. However,

due to lack of improvement of the clinical condition we had carried out the computed tomography scan of the thoracic segment of the vertebral column, which, on the level of VTh5 revealed the presence of penetration of one of the orthopedic screws into the aortic wall (Fig. 1).

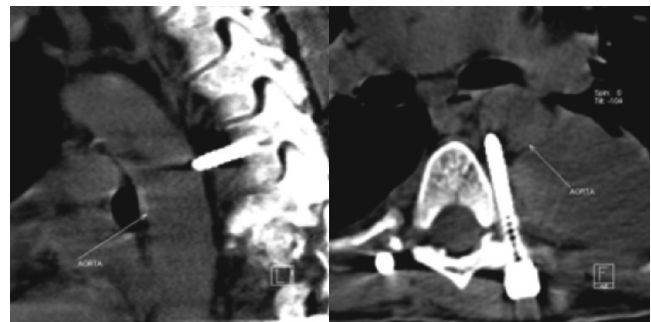


Fig. 1. Penetration of one of the orthopedic screw into the aortic wall

Ryc. 1. Penetracja śruby w ścianie aorty po stabilizacji piersiowej

The transverse scan of aorta did not reveal any penetration of screw into the vessel's wall. The patient was transferred to the center of vascular surgery as an urgent case, where a stent-graft was implanted to the site of aorta's damage.

On the second day after implantation of a stent, the penetrating screw was removed and a new screw was inserted transpedicularly. After performance of a procedure, the chest pains disappeared. The patient was transferred to the Rehabilitation Ward on the 10th day after the operation, in a good general condition.

During a several-months-lasting postoperative observation period, the patient did not complain about any pains, and control lung X-rays were normal.

Discussion

The aortic damage can be a result of a direct, penetrating injury, or blunt trauma (usually due to traffic accident, fall from height, etc.) or be an iatrogenic complication after the operative treatment of spine [2, 6, 7, 9, 10, 15].

An acute traumatic aortic tear is the second cause of death in traumatic patients in the United States, and the iatrogenic aortic damages are rare [5, 8-10]. They can be connected to discectomy, anterior procedures on the spine, or result from orthopedic screws wrongly implanted during posterior stabilization of the spine [2, 3, 5, 9].

In case of occurrence of prodromal symptoms or symptomatic complex accompanying damage of large vessels (pain, bleeding or recurrent hematoma of the operated region, tachycardia, decrease of blood pressure, difficulties with breathing, shortening of breath, coughing, hemoptoe due to pulmonary thrombosis, swelling of lower limbs due to phlebothrombosis), a fast diagnosis is possible.

Due to asymptomatic course, the diagnosis of aortic tear can be made many weeks, months and even years after the operation, usually as a result of accidental computed tomography [2, 3].

In our case a wrong implantation of screw was the reason. Even that before implantation of the screw the bone channel was verified with probe, using of too thick of a screw comparing to the arch's basis caused slipping of a screw from the channel. As a consequence the path of a screw was out of a basis and vertebral body.

The patient had suffered from chest pain ever since the procedure. At the beginning we thought that this is a typical postoperative course. For the first several weeks pain and periodically occurring fluid in pleura were thought to be a result of chest injury and rib fractures. A correct diagnosis was very hard to be established, because the blood laboratory tests results were normal, and control X-ray of vertebral column in both projections did not reveal any abnormalities.

Other authors also describe diagnostic difficulties in similar situations [2, 3, 5].

The patient did not experience a total perforation of the aortic wall. This allowed avoiding occurrence of dangerous bleeding, although Matsuzaki et al [2] described in their study a similar mechanism of lack of bleeding from aorta with a screw penetrating the vessel's lumen.

Our patient's aortic wall was modeled on the end of the screw, which was visible in CT scan. The risk of perforation was decreased due to remaining of low blood pressure (100/60 mm Hg) for the entire period of hospitalization.

The final diagnosis was established few weeks after the operation, therefore before the exchange of a screw we have decided to implant a stent-graft. Removing of a screw

could cause in this case occurrence of bleeding, caused by adhesions pulling the vessel's wall during screw's extraction or by sore created during the screw's contact with aortic wall.

We are sure that prophylactic implantation of stent-graft into the site of potential aortic tear before the restabilization of the vertebral column is a correct method. An alternative thoracotomy is connected to a large perioperative risk and more frequent postoperative complications, which is described by the authors of current publications [6, 11-14].

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