

Mesenteric Traction Syndrome-Like Symptoms Caused by Lung Traction: A Report of Two Cases

Risa Aoki, Tatsushige Iwamoto*, Toru Shirai, Masaki Fuyuta, Atsuhiko Kitaura and Shinichi Nakao

Department of Anesthesiology, Kindai University Faculty of Medicine, Osaka, Japan

*Corresponding author: Dr Tatsushige Iwamoto, Department of Anesthesiology, Kindai University School of Medicine, Osaka, Japan, Tel: +81-72-366-0221; Fax: +81-72-366-0206; E-mail: tatsushige1977@hotmail.co.jp

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Abstract

Mesenteric traction syndrome (MTS) is caused by traction of the small intestine and mesentery and is characterized by hot flushes, tachycardia, and low blood pressure. We experienced two cases in which patients exhibited MTS-like symptoms, such as tachycardia, hypotension, and facial flushes, after thoracotomy. After the intravenous administration of flurbiprofen axetil (50 mg), a cyclooxygenase (COX) inhibitor, the patients' arterial blood pressure recovered, and their facial flushes gradually disappeared. The patients' postoperative courses were uneventful.

It has been reported that the incidence of MTS among patients that undergo surgery for abdominal aortic aneurysms or laparotomic surgery ranges from about 30% to 85%. As MTS has been shown to be caused by the release of prostacyclin (PGI₂) due to traction of the small intestine and mesentery, COX inhibitors, such as flurbiprofen axetil, have been recognized as an effective treatment for MTS. The detailed mechanism by which MTS is induced has been demonstrated to involve traction-induced shear stress on the endothelial cells of mesenteric blood vessels activating COX, which consequently increases PGI₂ production, leading to vasodilatation throughout the body. Therefore, it seems reasonable that MTS can be caused by both abdominal and thoracic surgery.

Recent studies have revealed that MTS has become more common since the introduction of remifentanyl. It has been reported that remifentanyl itself can induce PGI₂ production and cause vasodilation *in vitro*.

Anesthesiologists should be aware that MTS can be induced by thoracic manipulation.

Keywords: Mesenteric traction syndrome; Lung traction; Cyclooxygenase inhibitor; Prostacyclin; Remifentanyl

Introduction

Mesenteric traction syndrome (MTS) is caused by traction of the small intestine and mesentery and is characterized by hot flushes, tachycardia, and low blood pressure. We experienced two cases in which patients exhibited MTS-like symptoms during lung operations, which were completely suppressed by the administration of flurbiprofen axetil, a cyclooxygenase (COX) inhibitor.

Case Report

Case 1

The patient was a 57-year-old male (height: 171.0 cm, body weight: 78.7 kg, body mass index: 26.9). A nodular shadow of 17 mm in diameter was detected in the right lung (S6) on chest computed tomography, and resection of the right lower lobe of the lung was scheduled under a suspicion of lung cancer. He had no relevant medical history, and no abnormalities were detected during preoperative blood tests, an electrocardiogram, or respiratory function tests. After epidural catheter placement at 5/6, anesthesia was induced with propofol and remifentanyl; the trachea was intubated with the aid of rocuronium; and anesthesia was maintained with sevoflurane in

oxygen and air, and remifentanyl. Just after the thoracotomy procedure, a marked reduction in arterial blood pressure (ABP) to 60/30 mmHg and an increase in heart rate to 120 beats per minute (bpm) were observed. We administered 8 mg of ephedrine three times and 0.1 mg of phenylephrine twice intravenously (iv), but the effect was temporary and insufficient. Noticing a facial flush, we suspected MTS and administered flurbiprofen axetil (50 mg) iv. Several minutes later, the patient's ABP recovered to 120/80 mmHg, and the facial flush gradually disappeared. The patient's postoperative course was uneventful.

Case 2

The patient was a 62-year-old male (height: 168.2 cm, body weight: 66.0 kg, body mass index: 23.3). He was diagnosed with lung cancer of the upper right lobe via bronchoscopy. A thoracoscopic right upper lobectomy was scheduled. He had a history of smoking and had previously suffered a thromboembolism, and thus, was given warfarin, which was changed to heparin 3 days before the operation. Preoperative blood tests showed high D-dimer (1.3 ng/ml) and total cholesterol (249 mg/dl) levels, but all of the other preoperative tests produced normal results. After epidural catheter placement at Th 4/5, general anesthesia was induced with propofol and remifentanyl, the trachea was intubated with the aid of rocuronium, and anesthesia was maintained with sevoflurane in oxygen and air. A few minutes after the thoracotomy procedure, a facial flush was seen, and a reduction in

ABP to 62/30 mmHg and an increase in heart rate to 100 bpm were observed. We administered 4 mg of ephedrine and 0.1 mg phenylephrine twice iv, but the effect was temporary and insufficient. After the intravenous administration of flurbiprofen axetil (50 mg), the patient's ABP recovered to 100/60 mmHg, and the facial flush gradually disappeared. The patient's postoperative course was uneventful.

Discussion

We have described our experience of two cases in which patients exhibited MTS-like symptoms, such as tachycardia, hypotension, and facial flushes, after thoracotomy, and the symptoms completely disappeared after the administration of flurbiprofen-axetil, a COX inhibitor [1].

It has been reported that the incidence of MTS among patients that undergo surgery for abdominal aortic aneurysms or laparotomic surgery ranges from about 30% to 85% [2,3]. MTS is induced by intraperitoneal manipulation, resulting in facial flushes, tachycardia, and hypotension, and it was once considered to be difficult to control [1]. However, as the cause of MTS was shown to be the release of prostacyclin (PGI₂) induced by traction of the small intestine and mesentery [3,4], COX inhibitors, such as flurbiprofen axetil, have been recognized as an effective treatment for MTS. The detailed mechanism by which MTS is induced has now been demonstrated to be as follows: shear stress on the endothelial cells of mesenteric blood vessels caused by traction activates COX and consequently increases PGI₂ production, which in turn induces vasodilatation throughout the whole body [1,3,4-6]. Therefore, it seems reasonable that MTS can be induced by both abdominal and thoracic surgery [7-10]. Actually, Matsumoto et al. [5] reported that traction of the lung stimulated the production and release of PGI₂, which resulted in facial flushes, palmar erythema, and reductions in ABP. In addition, recent studies have revealed that MTS has become more common since the introduction of remifentanyl. Nomura et al. investigated the effect of remifentanyl on the incidence of MTS in patients that were subjected to general anesthesia and found that the incidence of MTS was 10% in the procedures in which remifentanyl was not used and 40% in those in which remifentanyl was used [7]. Interestingly, Unlugenc et al. reported that remifentanyl itself induced PGI₂ production and caused vasodilation *in vitro* [8].

Conclusion

We experienced two cases in which patients exhibited MTS-like symptoms during lung operations, which were completely suppressed by the administration of flurbiprofen axetil, a COX inhibitor. Anesthesiologists should be aware that MTS can be caused by thoracic manipulation.

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