Standing position relieved the shoulder pain caused by subdiaphragmatic drain after laparoscopic surgery

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DESCRIPTION
A man in his 60s (64.0 kg; 161.5 cm) with a chief complaint of abdominal distension and vomiting was diagnosed with intestinal obstruction due to a transverse colon tumour by abdominal CT. Gastrointestinal endoscopy revealed a type II colon tumour of approximately 4 cm diameter, and biopsy examination revealed adenocarcinoma. There was no evident metastasis, and a laparoscopic colon resection was planned. Written consent was obtained to report the case. After inserting an infusion catheter in the epidural space from the T9-T10 interspace, general anaesthesia was administered using propofol, remifentanil, fentanyl and rocuronium. The operation time was 451 min, and the patient was in a head-down position for approximately 6 h. He complained of left shoulder pain after being awakened. We diagnosed that the pressure of the shoulder pad, holding the position during surgery, caused the postlaparoscopic shoulder pain (PLSP). We produced trigger point injections with 10 mL of 1% xylocaine, but PLSP was not relieved.

On postoperative day 1, the pain was still severe but was relieved when the patient was in a sitting or standing position. X-rays in the supine position show that the drain is in contact with the diaphragm (figure 1). We diagnosed that the drain under the left diaphragm caused left shoulder pain due to referred pain. The pain resolved immediately after removing the drain.

PLSP is a common complication. In many cases, prolonged pressure on the shoulder is the cause, but the referred pain mediated by the diaphragmatic nerve should be considered. Phrenic innervation (C3-C5) is placed on the central diaphragmatic pleura and the mediastinal pleura, while the supraclavicular nerve (C3-C4) conducts sensory input from the acromion process. Pain occurs in the scapula with stimulating the phrenic nerve. PLSP after laparoscopic cholecystectomy has been reported to be improved by diaphragmatic nerve block without respiratory depression. Previous reports of PLSP focused on stimulating the diaphragmatic nerve by carbon dioxide inflation, but we should remember that drains can also stimulate the diaphragmatic nerve. If the patient complains of shoulder pain where the drain is under the diaphragm, we recommend that the patient be placed in a standing or sitting position and see if the pain goes away.

Learning points
- Direct compression is not always the cause of shoulder pain after laparoscopic surgery performed in a prolonged head-down position.
- Pneumoperitoneum and subdiaphragmatic drains have been noted to stimulate the diaphragmatic nerve and trigger shoulder pain.
- If the drain under the diaphragm irritates the diaphragmatic nerve and triggers shoulder pain, it can be diagnosed because the symptoms improve when the patient is in a standing or sitting position.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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