

Multiple Right-Sided Rib Fractures With Features of Flail Segment

Case Study

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51-year-old, female cyclist who sustained multiple injuries, including multilevel rib fractures with flail segment following collision, was treated with Ribloc U Plus

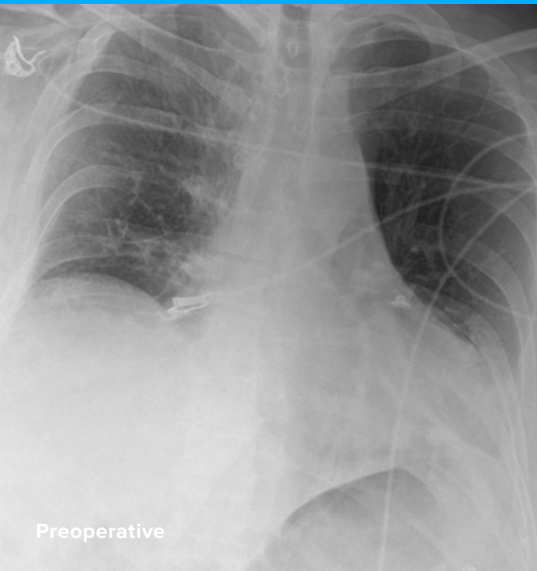


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Case Study



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Right video-assisted thoracoscopy and fixation of multiple posterior rib fractures

Patient History

A 51-year-old female with no significant past medical history, was brought in by ambulance to the emergency room after collision with a truck while cycling to work. She was wearing a helmet but had a momentary loss of consciousness and was unable to recall the event. She had bruising and deformity of the right clavicle and severe right-sided chest pain, but maintained a Glasgow Coma Scale score of 15. She was resuscitated and underwent a full-body CT scan. The CT scan confirmed right-sided displaced 3rd to 8th rib fractures in the anterior and posterior aspects, associated with a small pneumothorax and lung contusion. In addition, she had a comminuted right blade of scapular fracture, oblique fracture through the right mid clavicular shaft, and her right hemidiaphragm was raised. She also had a small liver laceration, injuries on her spine (wedge fracture of T4 vertebra, T3-T10 spinous process fractures, L4 left transverse process fracture), and her right hemidiaphragm was elevated. She was initially resuscitated and had an erector spinae local anesthetic infusion for pain relief and opioids. Despite this, she was in significant pain, and to avoid subsequent respiratory complications, rib fracture fixation was planned.



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Intraoperative Treatment

Under general anesthesia with double lumen endotracheal tube intubation, the patient was placed in the left lateral decubitus position on a vacuum beanbag positioner placed on the operating table. The table was flexed just above the level of the hips to expand the intercostal spaces. The lower leg was flexed at the knee, and a pillow was placed between it and the upper leg. The patient's position was secured by applying suction to the beanbag positioner, and the hips secured with a strap.

Following isolation of the right lung, video-assisted thoracoscopy surgery (VATS) was performed with a 5 mm thoracoscope using one port. This allowed inspection of the pleural cavity for associated injuries and drainage of any hemothorax. A paravertebral catheter was placed under direct vision for local anesthetic infusion for pain relief postoperatively. The chest wall was inspected from within by using the thoracoscope, and by manual palpation, the location of the fractures and the flail segment was visualized. As the posterior rib fractures appeared to be most displaced, overlapping, and causing the most distortion to the chest wall, fixation of these fractures was first performed. A posterior thoracotomy skin incision was then performed. This was centered at the level of the 6th intercostal space, and the latissimus dorsi muscle was divided. Dissection was performed down to the ribs, and the posterior rib fractures of the 5th to 8th ribs were located.

The intercostal muscle and tissue above each of the fractures were dissected cleanly off the rib. Reduction of the fractures was achieved using a small Langenbeck retractor to lift the underlapping rib end into position. A 50 mm RibLoc U Plus plate with Primary Guides attached was maneuvered over the top of the rib fractures. With the fracture centered in the middle of the plate, the U-clips at the ends of the plate were compressed by screwing the Primary Guides on either ends of the plate. This helped to reduce the fracture and hold it in position. With the correct screw size selected, the channels were drilled before the screws were driven into place. Once the first fracture was plated, it became easier to reduce the subsequent fractures for fixation. A total of four posterior rib fractures (5th to 8th) were performed. At this point, the flail segment was no longer clinically palpable, and the anterior fractures were reduced. It was therefore decided not to increase the patient's morbidity with further fracture fixation. A chest drain was placed under direct vision and the skin incision was closed.

Postoperative X-rays in the recovery room showed the rib plates to be well positioned.

Postoperative Care

The patient was transferred to the Higher Dependency Unit for ongoing monitoring. Her chest drain was removed on the second postoperative day. Subsequently, she underwent right clavicular fracture fixation using the Acumed midshaft plate. Following a period of rehabilitation, she was discharged from the hospital two weeks later with ongoing outpatient physiotherapy/physical therapy.

At two months postop, the pain around her right chest wall had significantly reduced, although she still required pregabalin for neuropathic pain. At five months postop, she no longer had pain and returned to work, swimming and exercising in the gym. Her chest radiograph showed the Ribloc U Plus plates to be well positioned, and her right lung to be better expanded with normalizing of the right hemidiaphragm position.

Discussion

I prefer the RibLoc U Plus Chest Wall Plating System because they are custom fit to ribs and come in different lengths. I often only use the 50 mm plates because I prefer to minimize the skin incisions and opt for multiple small incisions with minimal muscle cutting rather than one single large incision. The U-clips are compressed onto the ribs using the Primary Guide. This helps to reduce the fracture and keep the position stable as the screws are driven into position. Therefore, there is no need for additional rib and plate stabilizing clamps to keep the plate in position. The plating system design also ensures that the screws will always be locked in the right position. The RibLoc U Plus Plating System has significantly reduced my operative time compared to previous products I have used and resulted in good clinical outcomes for my patients.





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