Routine Postoperative Chest X-Ray Following Laparoscopic Nephrectomy

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ABSTRACT

Purpose: To determine whether a routine postoperative chest x-ray is required following uneventful laparoscopic nephrectomy to rule out pneumothorax.

Methods: From June 1999 to May 2003, 308 laparoscopic nephrectomy cases were performed by 5 different surgeons. This consisted of 121 radical nephrectomies, 106 donor nephrectomies, 29 simple nephrectomies, 29 partial nephrectomies, and 23 nephroureterectomies. Of the 308 procedures, 186 postoperative chest x-rays were obtained in the recovery room: 183 routinely and 3 for known intraoperative diaphragmatic injuries. Routine chest x-rays were not obtained in 122 cases due to the individual surgeon’s preference. Of these 122 patients, 15 underwent chest x-ray performed while hospitalized secondary to pulmonary issues or fever.

Results: Of the 308 cases, 4 pneumothoraces were identified on chest x-ray. Three were identified in the patients who had intraoperative identification of diaphragmatic injury. The fourth pneumothorax was identified in a patient who did not have a routine postoperative chest x-ray but did have a chest x-ray obtained due to postoperative shoulder pain. The pneumothorax in this patient resolved spontaneously. No incidental findings existed of pneumothorax in any patient who underwent routine postoperative chest x-ray.

Conclusion: In our series, a pneumothorax was identified either intraoperatively or based on postoperative clinical findings. None of the 183 routine postoperative chest x-rays changed patient management. Routine postoperative chest x-ray is not necessary in uncomplicated laparoscopic nephrectomy.

Key Words: Laparoscopy, Pneumothorax, Nephrectomy.

INTRODUCTION

Incidental pleurotomy is common during open flank surgery with an incidence between 8.5% to 25%. Therefore, most surgeons will obtain a postoperative chest x-ray (CXR) to rule out residual or unexpected pneumothorax (PTX). Injury to the diaphragm or pleura during laparoscopic renal surgery is much less common and is usually recognized at the time of surgery. Some surgeons apply this same principle of obtaining a routine postoperative CXR following laparoscopic nephrectomy despite the low incidence of unrecognized diaphragm injuries during these procedures.

METHODS

Between June 1999 and May 2003, 308 laparoscopic nephrectomies were performed at our institution. This included 121 radical nephrectomies (LRN) for known or suspected renal cell carcinoma (RCC), 106 donor nephrectomies (LDN) for kidney transplantation, 29 simple nephrectomies (LSN) for various benign diseases, 29 partial nephrectomies (LPN) for known or suspected RCC, and 23 nephroureterectomies (LNU) for known or suspected transitional cell carcinoma (TCC) of the upper urinary tract. We retrospectively reviewed all cases including a review of the operative report, perioperative chest films all read by an attending staff radiologist, and patient’s postoperative hospital course.

Based on individual surgeon preference, a routine immediate postoperative CXR was obtained in 183 patients in the recovery room despite no suggestion of intraoperative diaphragm injury or clinical signs or symptoms of PTX. Three additional patients had diaphragm injuries recognized intraoperatively and underwent postoperative CXR in the recovery room. Another 122 patients did not have routine postoperative CXR performed. Of these 122 patients, 15 patients had a subsequent postoperative CXR performed during their hospital course secondary to fever or clinical pulmonary signs or symptoms, such as low oxygen saturation levels or pleuritic chest pain.
RESULTS

A total of 186 postoperative CXRs were obtained in the recovery room. Of the 183 routine CXRs, no PTX was identified. The 3 additional CXRs were obtained due to diaphragmatic injury identified intraoperatively. Two of these patients required chest tube placement due to large PTXs despite intraoperative repair of the diaphragm injuries. The third patient had a small PTX that was managed expectantly. Of the 122 patients without routine postoperative CXR, only one PTX was identified on a CXR ordered for shoulder pain. The CXR revealed a less than 10% apical PTX. The patient was observed and remained hemodynamically stable. By the following day, the pneumothorax had spontaneously resolved. Fourteen additional patients that did not have an immediate CXR performed subsequently had a CXR performed during the course of their hospital stay for fever or pulmonary issues. None of these patients with delayed chest films had a PTX diagnosed.

DISCUSSION

Injury to the pleura is common during open flank surgery\textsuperscript{1,2} and can lead to pneumothorax if not recognized, not adequately repaired with evacuation of air from within the pleural cavity, or both. Therefore, following open flank surgery, most surgeons routinely order immediate postoperative CXR.

While unique causes of pleural injury exist during laparoscopy, injuries to the diaphragm are uncommon during laparoscopic surgery.\textsuperscript{3–5} Most diaphragmatic injuries are apparent and clearly visible with the magnified laparoscope. However, the only clue may be “billowing” of the diaphragm\textsuperscript{3} or clinical signs of pneumothorax, such as hypoxia or elevated airway pressures.

Some surgeons perform routine postoperative CXRs on all patients following laparoscopic nephrectomy due to their experience with open renal surgery. Although some debate exists,\textsuperscript{1} there does seem to be adequate justification for obtaining a routine CXR in all patients following open flank surgery secondary to the increased incidence of injuries. The question remains, however, if routine postoperative CXR is the standard of care following uneventful laparoscopic renal surgery, in light of the fact that unidentified diaphragm injuries and PTX are exceedingly rare.\textsuperscript{5–6}

In our series, routine CXR was obtained in the recovery room on 122 patients and was only performed in 15 of these patients when clinically indicated during the patient’s hospital course. Therefore, 198 CXRs were performed in 305 patients with uncomplicated laparoscopic nephrectomy. Only one PTX was identified in a patient who did not have a routine CXR and was managed without intervention. In addition, no patients suffered a significant pulmonary event who did not have a CXR performed at some point in their postoperative course.

Three of the 308 procedures were complicated by diaphragm injuries recognized intraoperatively. One patient undergoing a right-sided LPN was noted to have “billowing” of the diaphragm. Closer inspection revealed a pinpoint hole in the diaphragm at the location where the liver retractor was clamped to the diaphragm. Postoperative CXR revealed less than 10% pneumothorax, and this patient was observed. Two patients had small diaphragm injuries caused when lysing adhesions from the colon to the diaphragm. Both of the patients had intraoperative repair of the injury, but still required chest tube placement secondary to large residual pneumothorax on postoperative CXR.

In our series, only one PTX was identified following cases of laparoscopic nephrectomy without evidence of diaphragm injury. Routine postoperative CXR did not change patient management, nor did the absence of a routine postoperative CXR in 122 cases adversely affect patient recovery. Due to its low yield, we do not recommend routine postoperative CXRs following uncomplicated laparoscopic renal surgery.

CONCLUSIONS

Routine postoperative CXR is not required in patients undergoing uncomplicated laparoscopic renal surgery. However, patients with a diaphragm injury recognized during surgery or patients with clinical signs or symptoms of a pneumothorax should have a chest x-ray performed.

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