Recovery Room Radiographs After Total Hip Arthroplasty

Tradition vs Utility?

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Abstract: Routine inpatient radiographs after total hip arthroplasty can be taken in the recovery room immediately after surgery or in the radiology suite later in the hospital stay. In a review of 632 consecutive recovery room series, we found that 17% of series were inadequate to detect technical issues. We identified technical issues on 12 series (1.9%) and technical issues that impacted inpatient management on 2 series (0.3%). One of these 2 was a dislocation that was detected clinically before imaging. The other was a medial penetration of an acetabular screw that probably did not require the immediate revision that it received. Findings suggest that the single routine inpatient series should be taken in the radiology suite, rather than in the recovery room.
Keywords: hip, arthroplasty, radiograph, recovery room, dislocation, fracture.

In the perioperative setting, potential complications of total hip arthroplasty (THA) include malalignment, dislocation, periprosthetic fracture, and others. For early recognition of such issues, evaluation of component position, documentation that the hip is reduced, and comparison to follow-up images, the standard of care is to obtain postoperative radiographs before patient discharge. Many surgeons elect to take these postoperative radiographs in the recovery room or post anesthesia care unit (PACU). An alternative is to take them in the radiology suite later on the day of surgery or soon after.

When radiographs are taken in the PACU, technicians use a portable machine at the patient's bedside. Unfortunately, portable machines present difficulties with patient positioning and exposure that evidence suggests often lead to images that are inadequate to diagnose technical issues. In a review of imaging from 100 patients undergoing cemented arthroplasty, Mulhall et al [1] found that the image quality of PACU radiographs was significantly inferior to that of radiographs taken in the radiology suite. For this reason and others, studies have also suggested that PACU radiographs may be of limited clinical utility [1,2]. Most significantly, Mulhall et al found a 0.1% rate of radiologic diagnosis of dislocation among 2065 consecutive hip arthroplasty patients. The study reported that routine PACU radiographs are not an effective screening procedure, needing 1000 to diagnosis 1 dislocation. They found clinical examination to be equally effective at diagnosing dislocation and recommended that PACU radiographs be obtained only when clinically indicated.

We take as given that it is critical that quality postoperative images are obtained, reviewed by the operating surgeon and repeated if inadequate before patient discharge. Our theory is that it would be better to take these images in the radiology suite somewhat later in the hospital stay than to take them immediately after surgery in the PACU. Accordingly, this study has 2 parts: First, we will determine the rate of adequacy for images taken in the PACU. Second, we will determine the rate at which PACU radiographs uncover technical issues that require immediate (before the patient leaves the PACU) correction.

Methods

We retrospectively evaluated a consecutive series of cases of primary THA that were performed at our institution between January 2006 and December 2009. Cases were identified by *Current Procedural Terminology* code from our institution's operating room database.

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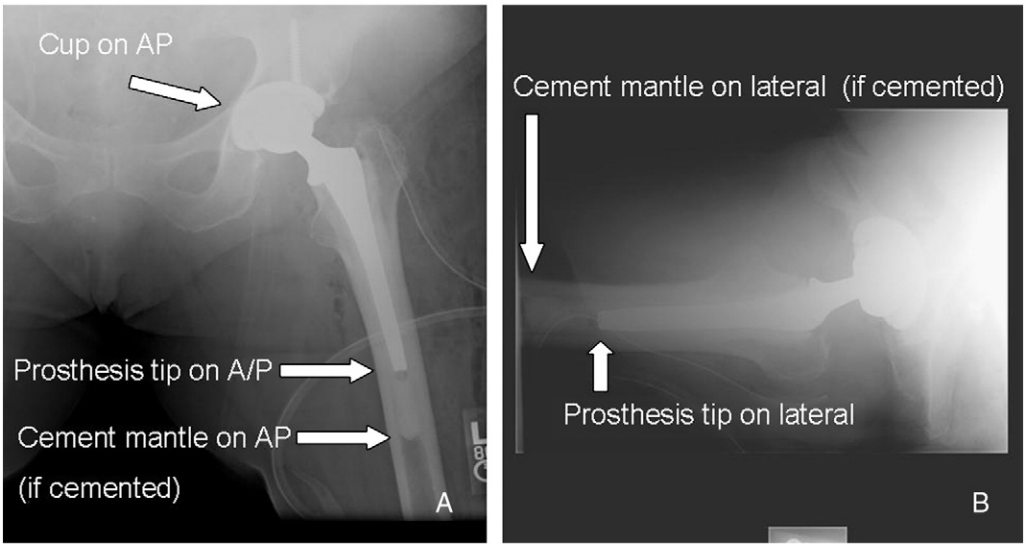

Fig. 1. Examples of adequate radiographs. Anteroposterior (A) and lateral (B) radiographs of 2 different patients showing criteria used to determine adequacy of recovery room radiographs.

Only cases performed for degenerative pathologies were included (those performed for acute fracture and/or oncological etiologies were excluded). All the patients were evaluated with immediate, postoperative, portable PACU radiographs, as this has been the standard of practice at our institution. These were each evaluated by 1 of 2 reviewers (KJ and AN).

Technical adequacy of each radiograph was assessed (Fig. 1). An anteroposterior (AP) radiograph was found to be adequate if it included the acetabular cup, the inferior tip of the prosthesis, and the inferior aspect of the cement mantle if the prosthesis was cemented (Fig. 1A). A lateral radiograph was found to be adequate if it included the inferior tip of the prosthesis, and the inferior aspect of the cement mantle if the prosthesis was cemented (Fig. 1B). Some at our institution consider it necessary to see the acetabular cup on the lateral radiograph, but others do not consider it necessary (due to challenges with demonstrating it radiographically and inadequacies of using it to evaluate version on portable radiographs). Hence, although we recorded visualization of the acetabular cup on the lateral radiograph, we did not deem a lateral radiograph inadequate if it was not fully visualized. A series was found to be inadequate if there were inadequacies on either the AP or lateral images (Fig. 2).

Technical issues from the surgery were also assessed. Issues included the presence of dislocation, fracture, protrusio, cement extravasation, or any other significant finding on either the AP or lateral radiographs.

The radiologist-reported interpretation of each radiograph was reviewed to evaluate for comments on adequacy of images and/or technical issues. To assess if inadequate radiographs were repeated during the hospitalization, each radiographic record was reviewed for additional radiographs within 1 week of surgery.

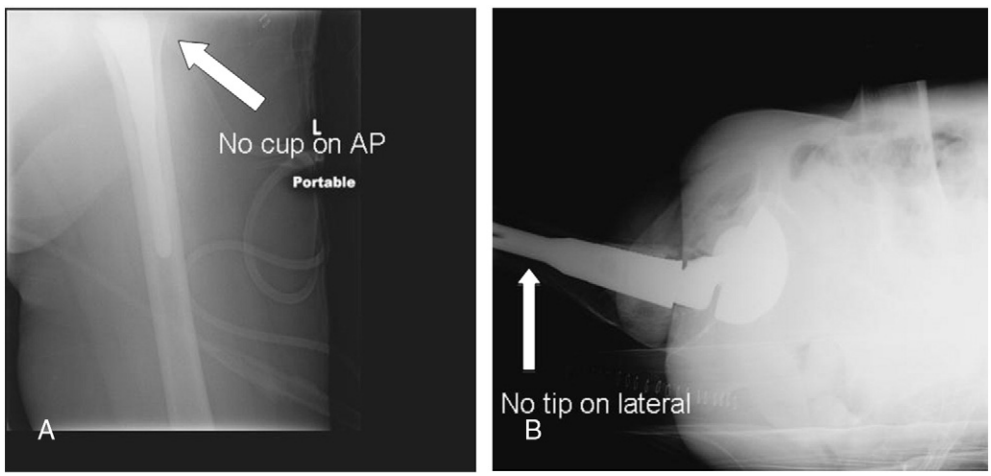

Fig. 2. Examples of inadequate radiographs. Anteroposterior (A) and lateral (B) radiographs from 2 different patients showing examples of inadequate recovery room radiographs.