ORIGINAL ARTICLE

Impact of Performing Nonurgent Interventional Radiology Procedures on Weekends

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Abstract

Most clinical services limit weekend care to urgent or emergent situations. However, providing access to nonemergent procedures on weekends may reduce length of hospital stay and unnecessary admissions. No data are available on the impact of providing nonemergent interventional radiology (IR) procedural services on weekends. A retrospective review of nonurgent IR inpatient services on weekends over a 12-month period was performed. Using intent-to-treat analysis, 453 procedures were performed on 447 patients on 100 weekend days. Procedures included venous access (116 of 453, 25.6%), dialysis interventions (83 of 453, 18.3%), enteral access (73 of 453, 16.1%), genitourinary interventions (37 of 453, 8.2%), venous interventions (35 of 453, 7.7%), biliary interventions (33 of 453, 7.3%), percutaneous drainage (32 of 453, 7.1%), biopsy (24 of 453, 5.3%), arterial interventions (14 of 453, 3.1%), and other (3 of 453, 0.7%). Routine weekend procedural services allowed 108 of 447 (24.2%) patients to be discharged earlier than anticipated if such services were not available, resulting in 174 hospital days gained. Procedures were performed earlier than anticipated in 268 of 447 (60.0%) patients resulting in 415 days of progression of care gained over the 12-month period. For dialysis interventions, 35% (29 of 83) of patients received hemodialysis within 24 hours of intervention, and 25 patients were discharged early with 33 hospital days saved. IR procedures were performed on patients from 97% of the hospital inpatient units (22 of 23 inpatient or observation units, and 10 of 10 intensive care units) over the 12-month period. In conclusion, increased availability of nonurgent IR services on weekends can directly reduce hospital length of stay as well as improve progression of inpatients toward an early discharge.

Key Words: Weekend effect, interventional radiology, inpatient, procedures, early discharge

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INTRODUCTION

Most clinical services for inpatients continue to operate on a 5-day-a-week (weekday) schedule for routine inpatient care and offer reduced coverage on weekends [1,2]. Weekend coverage by imaging and laboratory services and surgical and procedural specialties is typically offered for urgent and emergent situations. Yet, reduced access to clinical services on weekends is associated with worse clinical patient outcomes [1,2]. In fact, a "weekend effect" during hospital admission, resulting in delays in access to care, longer length of stay, and worse patient outcomes, has been described for a range of clinical conditions, including burn injuries [3], peptic ulcer disease [4], and myocardial infarction [5]. Moreover, higher weekend mortality rates have been reported for 23 of the 100 leading causes of inpatient deaths [6]. Most importantly, expansion of routine clinical services (such as gastrointestinal endoscopic interventions or cardiac catheterization) to weekends has been shown to reduce hospital length of stay and health care costs [7,8].

Interventional radiology (IR) clinical services during weekends are also limited to emergent procedures, even though many other clinical services rely on IR procedures for progression of care (eg, venous access, drainage, enteral access) [9,10]. No data are available on the anticipated volume, types of cases, or impact of expanding availability of routine IR procedures to

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include weekends. At our institution, with increasing patient volume and in an effort to reduce patient length of stay and improve clinical care, we implemented a weekend IR service to provide nonurgent procedures to inpatients. Here, we present a retrospective review of results of implementing a program that offers nonurgent IR services for hospital inpatients on weekends over a 12-month period.

MATERIALS AND METHODS

Program Outline

The program was implemented at a tertiary care, academic medical center with 725 beds. During program development, procedures were categorized as emergent (typically patients with impending or ongoing hemodynamic instability), urgent (same-day procedure required to prevent adverse outcomes), and nonurgent (same-day procedure not required to prevent adverse outcomes). Conceptually, the intent of the program was to provide nonurgent IR services from 8:00 AM to 4:00 PM on weekend days (Saturdays and Sundays, and excluding Monday hospital holidays). The staffing model consisted of an IR attending physician, two IR technologists, two IR nurses, and an IR advanced practice provider (APP, either a nurse practitioner or physician assistant) per weekend day (subsequently referred to as the elective team). Although our department has a dedicated IR fellowship and residency, trainees were not utilized for this program. The APP functions as the contact point for referring clinical services, reviews all consults with the IR attending, evaluates and consents patients, and completes any preparations required for the procedure (eg, arranging for blood transfusion, premedication). At our institution, a single nurse-and-technologist team is required to perform an IR case with moderate sedation. The program provided two separate nurse-and-technologist teams to allow rapid recovery and room turnaround postprocedure. No outpatient procedures were performed by this service. Two separate on-call teams (fellow, attending, nurse, technologist) worked in parallel and were responsible for consults and procedures for all emergent indications (subsequently referred to as the on-call team). An IR on-call team was responsible for all urgent and emergent consults that involved vascular, biliary, or genitourinary procedures. A second separate cross-sectional IR on-call team comprised of an abdominal radiologist attending and fellow performed urgent ultrasound- and CT-guided abscess drains, paracenteses, thoracenteses, and biopsies. The elective team could perform urgent procedures, if they were available; otherwise these procedures were performed by the on-call teams.

Study Population

A waiver from the Institutional Review Board was obtained. All patients who underwent IR procedures on weekends (September 17, 2016, to September 16, 2017) were retrospectively reviewed using a prospectively maintained database of patients who received care as part of this program. Patients with urgent indications who had procedures performed by the elective team were also included for analysis. Patients in whom there was an intention to perform a nonurgent procedure but the procedure was not performed because of clinical or procedural reasons were included in the overall analysis (intent-to-treat). Any patients treated by the on-call team were excluded from analysis.

Overall the program provided services on 100 weekend days (services were not provided on hospital holidays and two holiday weekends). For all patients who fit inclusion and exclusion criteria, detailed review of the electronic medical record was performed for procedure reports, clinical documentation of inpatient care before and after the procedure, discharge summaries, and laboratory values. This analysis only included patients and procedures done by the weekend teams as part of this program and specifically does not include procedures done by separate on-call IR teams during the same period. Medical record review and assessment of outcome measures was performed by a single interventional radiologist with 8 years of experience in the practice.

Outcome Measures

The database was reviewed for number of patients and procedures, as well as procedure type. Indications for the procedure and elements of clinical care provided in days before and after the procedure were separately recorded to assess for impact on clinical care.

Cases performed by the elective team were divided into urgent, defined as those cases that the on-call team would have performed based on clinical indication if the elective team was not available, and nonurgent, defined as cases in which the procedure did not need to be performed until the next available weekday based on the clinical indications. Nonurgent procedures were divided into procedures that "facilitated discharge" (FD) from the hospital and procedures that resulted in "progression of care" (POC). FD procedures were defined as those performed on inpatients or emergency department patients