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Radiological Imaging and the Emergency Department: Teamed for Success. A Patient-Centered Approach to Emergent Imaging Practices

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A B S T R A C T

The emergency department (ED) and the radiology department must work together to ensure safe and effective diagnostic imaging results for ED patients. Effective collaboration between these departments ensures safe patient care as well as patient and staff satisfaction. This article will look at the various points where the ED and the radiology department intersect in the care of the ED patient and suggestions for how to improve those intersecting points of care to ensure a seamless patient care experience.

Introduction

According to the Centers for Disease Control and Prevention, the average life expectancy in the United States in 2015 was 78.8 years compared with that in the United States in 1900, which was only 47.3 years (National Center for Health Statistics, 2017). Many factors contribute to this significant increase in life expectancy, but one could argue that there is a strong correlation between improvements in health care and life expectancy in our country.

The delivery of health care has become increasingly complex over the years. Complexity in turn leads to increased specialization, and increased specialization results in the need for more individuals to be involved in every patient encounter. Although this may translate into improved patient outcomes, it also requires multiple individuals to work together seamlessly to ensure a smooth patient care encounter.

The emergency department (ED) is an excellent example of this microcosm of specialties. Emergency medicine, medical specialties, nursing, radiology, the laboratory, admitting, and social work are examples of specialties frequently having to intersect, often in 2 hr or less, during an ED visit. The fact that these specialties interface in any form of fluidity seems amazing. However, the potential for communication breakdowns resulting in less than optimal patient outcomes and increased friction between departments is ever present.

The Radiology Department and the ED

In this article, we want to focus on the collaboration between two specific specialties, namely emergency nursing and radiology technologists. Recent advances in radiology means that ED patients are more likely than ever to receive a radiological examination as part of their ED visit. In fact, Hitti et al. (2017) reported that currently nearly half (46.8%) of ED patients receive some sort of imaging as part of their ED visit, which in 2002 was 40.7%—quite an increase. As many as 33% of all computed tomography (CT) examinations are performed on ED patients (Choy & Novelline, 2013). The increase in the use of radiology examinations by the ED requires the staff of these two departments to interact and collaborate more than ever before.

The American University of Beirut Medical Center performed a quality improvement project using lean methodology to look at the ways to improve turnaround times for ED patients receiving radiology examinations. This project identified four main steps in the process (Hitti et al., 2017):

1. Order entry to order processing time.
2. Transportation turnaround time.
3. Study initiation to completion time.
4. Preliminary report turnaround time.

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We will use the four steps from this study as a model for identifying ways that collaboration between the radiology department and ED can be improved.

Step 1: Improving Order Entry to Order Processing Time

Order entry to order processing time is defined as the time between the examination being ordered or requested and the request being processed by both the ED and the radiology department.

In this step, effective communication is paramount for success. The importance of effective communication in the delivery of health care has been thoroughly studied and written about. Bailey (2016), for example, reports that nearly 2,000 patient deaths over 5 years can be attributed to poor communication. The article goes on to report that in that same period, $1.7 billion dollars in malpractice costs may be attributed to communication failures. That accounts for 30% of all malpractice cases.

Order entry and order processing relies on effective communication both in the ED and between the ED and the radiology department. The ED environment brings many barriers related to order entry to order processing time. Multiple patients and patient acuity levels can prevent the attentiveness needed to process orders in a timely manner. Although one may assume that the use of computers has improved communication between departments, this is not necessarily always the case. Troude et al. (2014) found that somewhere between 2% and 29% of orders for radiological examinations contained either inadequate or incomplete information. Inadequate or incomplete information may be something as simple as the name of the ordering physician to something as crucial as serum creatinine levels or presenting complaints. These errors could result in improper or inadequate examinations being completed or delays in initiating those examinations because of misinformation or time needed to clarify information.

It is incumbent on the ED to have processes in place to ensure that correct information is provided to the radiology department in advance of the examination. If automated ordering systems are used, both the ED and the radiology department should have representatives on the planning team to ensure that appropriate information fields and prompts are included on the computerized ordering system. It is also essential that ED staff are provided education on information that is necessary for each radiological examination to be processed and completed in a timely manner.

Technology should also be leveraged to ensure communication between the departments is seamless. Now that patient records are maintained electronically, processes should be in place to ensure that the medical record is easily accessed by the radiology department. An interdisciplinary team represented by ED and radiology department can ensure that the medical record is configured in such a way that members of the radiology team can access relevant information easily. Information such as patient symptoms, relevant patient history, possible pregnancy, allergies, and potential renal impairment should be easily accessible. This information is essential to the radiology department to be able to plan the examination, ensure patient safety during the examination, and increase the accuracy of results. If this information is not readily available or has not been entered into the patient record by members of the ED team, the potential for delays and errors significantly increases (Envision Physician Services, 2015).

It is essential that both the radiology department and the ED are involved in establishing the information that should be shared at this stage. The ED may not consider, for example, that documenting not only the presence of an intravenous line but also the size of the line can be essential information for the staff of the radiology department. Considerable time can be lost if the staff of the radiology department has to track down the ED nurse to find out if an intravenous line is capable of the high flow required for some intravenous medications administered in radiology department.

There is also compelling evidence in the literature that the use of clinical decision rules (CDRs) may help reduce overuse of radiology examinations, potentially decreasing waits in patients who legitimately require those examinations. CDR is also an effective communication tool that can be built into the order entry system allowing standardized information to be shared between radiology department and ED. A CDR is an algorithm derived from research that empowers clinicians with risk assessments for a given constellation of clinical signs and symptoms. Two examples include the Pediatric Emergency Care Applied Research Network head injury rule and the Well's Score (to determine the necessity of radiology examinations for the diagnosis of a deep vein thrombosis). Because these scores require the input of specific diagnostic criteria, they not only assist with determining the necessity of specific radiology examinations but also allow the sharing of standardized data between emergency care providers and the radiology department. This can help ensure accuracy in obtaining and interpreting diagnostic tests (Bruno, 2014).

Step 2: Transportation Turnaround Time

Transportation turnaround time is defined as the time between the request being processed and transport to the appropriate area of the radiology department.

One of the biggest intersections between ED and radiology department is the transport of patients between the two areas. It can be very frustrating for the ED nurse to be retrieving medication from the central nursing area for a patient in significant discomfort only to return to the patient room and find the patient already gone to radiology for their examination. But it can be equally frustrating for the radiology department to lose precious time holding a CT scanner open for an ED patient at the expense of other patients needing that CT scanner. This does not even factor in patient safety issues, such as transporting a patient to radiology department without checking with appropriate ED personnel about whether the patient requires continuous nursing monitoring for an unstable condition.

Transportation turnaround time returns to the core element of effective communication between the departments. One technique that facilitates this is an electronic patient tracking system shared between the two departments. Normally, the ED and radiology department are multidimensional silos that function independently of one another. But one of the authors of this article (J.W.) has been working on a process improvement project within his facility to maximize the functionality of the patient tracking system using communication flags.

The project involves a 37-bed Level III trauma-designated ED that sees a volume of approximately 55,000 patients annually. Icons were added to the electronic patient tracking system that are easily recognizable by both the ED and the radiology department. When a patient, for whom a radiology examination has been ordered, is ready for transport, the ED simply activates the icon by the patient's name electronically. This communicates to the radiology staff to initiate transport, saving significant time in placing and receiving telephone calls between the two areas. Although this intervention is simple, it has been proven to be effective in other hospitals throughout the Pacific Northwest.

In addition to the most effective use of the electronic health record, the who and how of transporting the patient to the radiology department has shown to provide great gains in improving flow. Hitti et al. (2017) were able to reduce their transportation turnaround times significantly by assigning a dedicated staff person to transport patients to and from radiology. They recognized that

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