

AUDIT

Radiological delay and the impact of radiological delay on Emergency department throughput

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ABSTRACT

INTRODUCTION

Radiological delay is one of the main causes of the increase in throughput time of ED. The objective of this study was to ascertain the performance delay of the radiological investigations frequently utilized in ED including CT scans, ultrasound, and MRI, and ways to improve the throughput.

METHODS

Data of CT, MRI, and Ultrasound of all the patients presenting to ED was collected from January 2018 till March 2018 from the MIS of Shifa international hospital. Specific parameters were set and the report extracted with the help of MIS. The data points were set according to the preset schedule and analyzed. The results were then plotted graphically.

RESULTS

A total of 3829 radiological investigations were performed through the emergency department during the three-month study duration. CT scans were performed within 2 hours for 74% of times it was ordered whereas for ultrasound, it was only 52% of times it was ordered. 22% of the MRIs were done within 2 hours.

CONCLUSION

A delay in the radiological investigation can be one of the factors causing a delay in emergency throughput. Ultrasound takes a longer time to be performed as compared to CT scans in our population. Factors underlying this difference can be studied in further studies.

KEYWORDS

Radiological delay; ED throughput; overcrowding

INTRODUCTION

Emergency department (ED) physicians face many challenges daily with ED overcrowding being top of the list, leading to an increase in throughput, compromising ED flow.⁽¹⁾ Throughput includes the processes that occur in the emergency department that impact the inpatient flow comprising of triaging, staffing, availability of specialty, diagnostic services, scheduling of surgeries, and hospital resources including information technology.^(2, 3) Radiological delay is one of the causes of delay, resulting in delayed diagnosis, increase waiting times, increased length of stay, decreased patient satisfaction, delayed patient disposition, strain useful hospital resources, and ED physician and staff burnout.^(4, 5)

OBJECTIVES

The objectives of this audit were to ascertain the performance delay of the frequently utilized radiological investigations. These include Computed tomography (CT), Ultrasonography (USG), and Magnetic Resonance Imaging (MRI). The performance time would start from the time of ordering of the test till the time that the test is performed. Our

objective is to focus on factors that delay the performance time, so we can then ascertain the reason and ways to improve the delay.

METHODS

A three months data for all patients presenting in ED of CT, MRI, and USG of ED was collected from January 2018 till March 2018 from the MIS department of Shifa International Hospital, Islamabad. The radiology ordering and reporting are done through electronic means thus the input points are accurate and can be easily measured and reproduced. Specific parameters were generated and report extracted with the help of MIS (Medical information system). Those data points were then arranged according to the preset schedule and analyzed. The result was then tabulated and plotted graphically.

Time scales were set and patients were categorized according to their radiology scans performance time since the time of ordering.

Time scales were set as follows:

Performed in: 1 to 30 minutes

Performed in: 31 to 60 minutes

Performed in: 61 to 120 minutes
 Performed in: 121 to 180 minutes
 And performed in more than 180 minutes
 Significant delay: > 120 minutes

RESULTS

A total of 3829 radiological investigations were ordered from the Emergency Department in 3 months, the breakdown of which is shown in Figure 1.

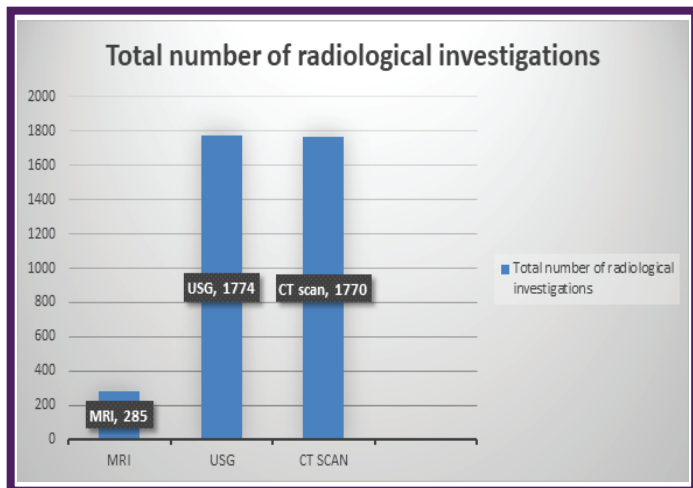


Figure 1- Total number of radiological investigations performed.

Each graph represents a separate modality and its delay ratio. When looking into the CT scans, 1770 were done, out of those 250 (14%) were performed within 30 minutes, 448(25%) within 31 to 60 minutes, 621 (35%) within 61 to 120 minutes, 221 (13%) within 121 to 180 minutes, and 225(13%) were performed in more than 180 minutes. So within 2 hours (120 minutes), 1319 CT scans were done which is 74% of the total CT scans. An extreme delay of more than 180 minutes was observed in 225 patients.

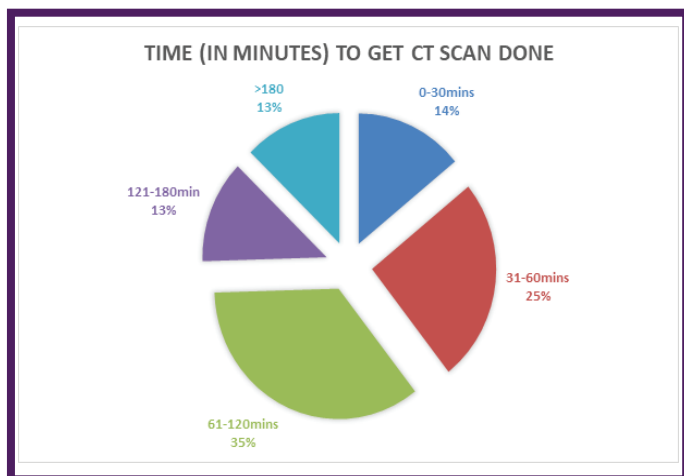


Figure 2: Time (in minutes) to get a CT scan done

In USG 1774 were done, out of those 78 (5%) were performed within 30 minutes, 267(15%) within 31 to 60 minutes, 563 (32%) within 61 to 120 minutes, 312 (18%) within 121 to 180 minutes, and 524 (30%) were performed in more than 180 minutes. In 2 hours (120 minutes) 908 ultrasounds were done which were 52% of the total ultrasounds performed. An extreme delay of more than 180 minutes was observed in 524 patients.

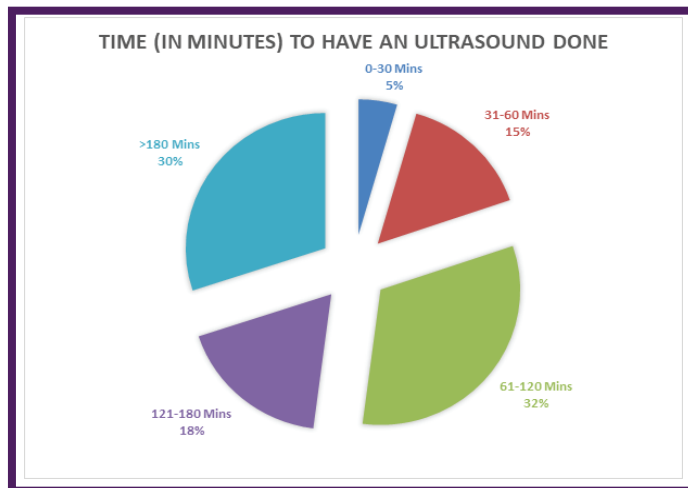


Figure 3: Time (in minutes) to get a USG scan done

In MRI, 285 were done, out of those only 1(0%) was performed within 30 minutes, 10 (3%) within 31 to 60 minutes, 53 (19%) within 61 to 120 minutes, 28 (10%) within 121 to 180 minutes and 193 (68%) were performed in more than 180 minutes. In 2 hours(120 minutes) 64 MRI scans were done which were 22% of total MRI scans. An extreme delay of more than 180 minutes was observed in 193 patients.

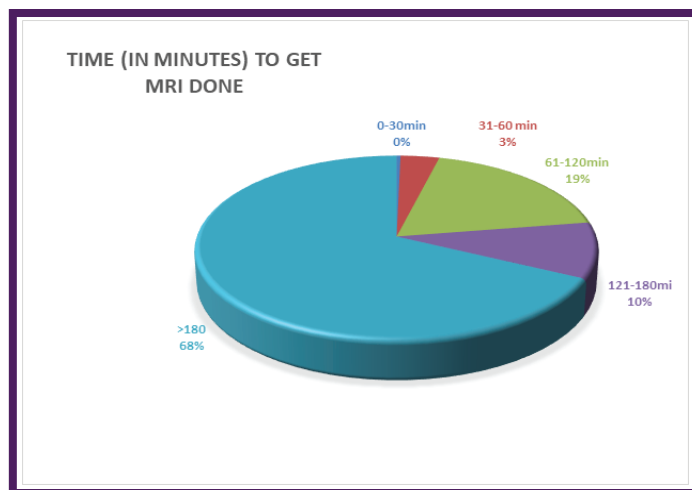


Figure 4: Time (in minutes) to get an MRI scan done

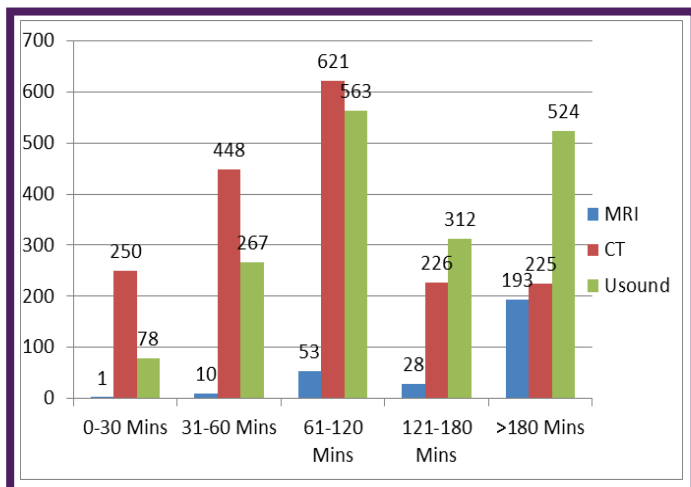


Figure 5: Comparison of three modalities of imaging and their relative periods

As seen from the results, a significant delay was seen in USG with a total of 52 percent being performed in two hours. There is a significant rise in CT scans as well of 74 percent being performed in 2 hours.

DISCUSSION

We know the diagnostic advantages and disadvantages of ultrasound and CT scans yet the timely performance of radiological procedures will result in early detection of diseases as well as ruling out certain diagnoses. When compared only 52% of ultrasounds were done within 2 hours while 74% of CT scans were done within 2 hours. This means getting an ultrasound may result in a high incidence of delay as compared with CT scans. We should improve the performance time of ultrasound to improve the throughput. We need to get a detailed breakup of the causes of these delays so we could address the causes responsible for the delay.

RECOMMENDATIONS

Create the baseline performance time of all the modalities of radiology.

CT scans are more expensive and expose the patient to radiations, if not indicated should not be ordered in the presence of an ultrasound facility which rules out various diagnoses. And CT scan should be ordered with a consultant on floor approval.

There should be communication between the emergency and radiology department for the turnaround times of 3 months duration.

A further audit should be carried out to ascertain the indication of CT scan being ordered and to see if the findings correlate with them.

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