A Real-Time Status Monitor As A Tool For Operating Room Management

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Abstract

INTRODUCTION

Optimal management of an operating room suite requires up to date information about the status of the cases in progress. Technology is now available that allows real-time analysis of operating suite utilization when integrated with a commercially available automated record keeper. We describe the development of such a system.

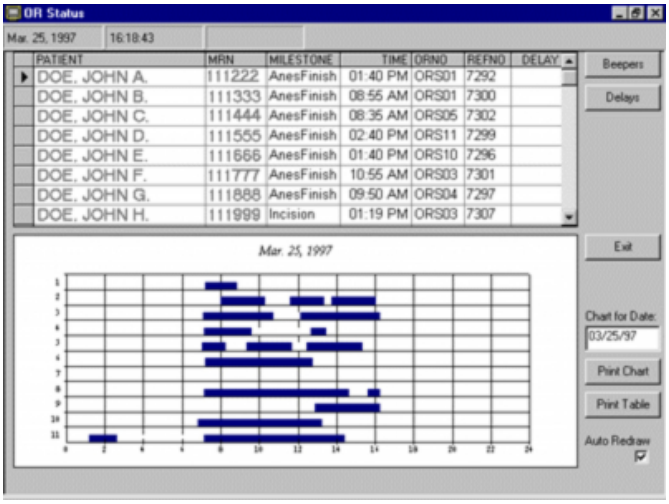
METHODS

A software tool to aid in real-time monitoring of operating room (OR) status was written with readily available application development systems. Using a previously installed LifeLog Patient Tracking System (Modular Instruments, Malvern, PA) tracking events (in room, prep, closure, etc.) were entered in the automated record and transmitted over a Netware 3.12 local area network (Novell, Inc., Provo, UT) where they were stored in an Oracle Workgroup Server 7.3 relational database (Oracle Corp., Redwood City, CA) Figure 1.

To aid the O.R. management process, a computerized status screen, programmed in Visual Basic 4.0 (Microsoft Corp., Redmond, WA) and later converted to Visual Basic 5.0, was devised and installed in March 1997 (Figure 2).

Figure 1

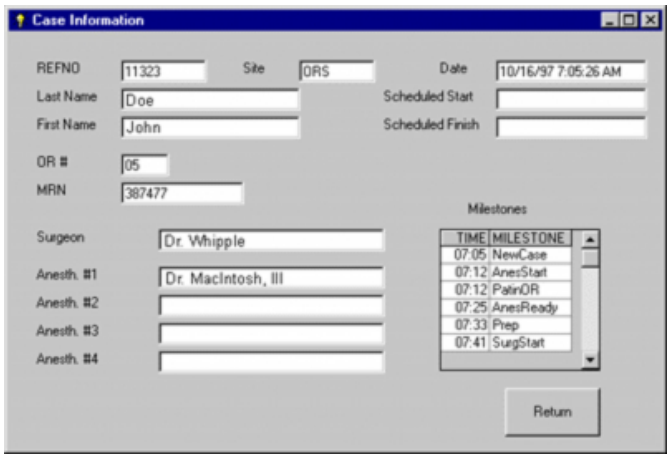
Figure 2. Operating Suite Status Screen



This tool accessed the tracking data and continuously displayed patient status in each OR along with the real-time Gantt chart representing the entire suite. Mouse clicks on “hot spots” on both the grid and the chart display other screens with further details about the case and time intervals such as turnover time (minutes between previous patient leaving room and next patient entering [1]) Figure 3. Turnover times were automatically calculated and logged in the Oracle database for later retrieval and analysis.

Figure 2

Figure 3. Operating Room Detail Screen



RESULTS

Data is presented as mean turnover times for each month, along with the number of turnovers (Figure 4). The month of February, 1997 represents the month just prior to implementation of the tool while March and April, 1997 represent the months immediately afterwards.

Figure 3

Figure 4. Turnover times before and after implementation of the system.

	Feb. 1997	Mar. 1997	Apr. 1997
N (number turnovers)	141	160	163
Average Turnover Time (minutes) +/- S.D.	32.0 +/- 12.6	31.5 +/- 12.5 #	29.7 +/- 12.1 *

- # not significant compared to Feb. 1997
- * $P < 0.05$ compared to Feb 1997.

DISCUSSION

Real-time Gantt charts are available for other tracking systems [2], however this tool provides a continuously displayed chart that can be used with a commercially available automated record keeper. Using the real-time Gantt chart, management personnel can easily identify what rooms are underutilized and notice delays as they are occurring, thus improving turnover times. On cases shown to be in progress, the simultaneously displayed grid provided information on the case's progress. The improvement in turnover times that we noted in this study was small, but statistically significant. Having this information continuously displayed on one screen provides OR managers with a tool that assists in decreasing OR turnover times and allows the study of other quantities such as OR utilization.

We wish to acknowledge Dr. David Watkins for his help in introducing us to the concepts involved in patient tracking.

References

1. R T Donham, MD, PhD, W J Mazzei, MD, R L Jones MD, MBA, "Association of Anesthesia Clinical Directors' Procedural Times Glossary," American Journal of Anesthesiology, 23 S5 (1996), 4-12.
2. DeRiso B, Cantees K, Watkins WD, The Operating Rooms: Cost Center. Management in a Managed Care Environment International Anesthesia Clinics 33:133, 1995.

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