The virtual neonate in The Neonatal Intensive Care Unit: When twin number three adds up to error not imagination

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ARTICLE INFO

ABSTRACT

Background: During the administrative admittance of extreme premature twin neonates to the Hospital Information System (HIS), at an Israeli government general hospital, a third virtual baby was mistakenly admitted in addition to the twins. The third virtual baby's records were in department occupancy and transactions were performed in the HIS, such as "admittance" to Neonatal Intensive Care Unit (NICU), being appended to a mother as well as clinical orders.

Methods: Once noticed, the records of the third virtual baby were merged in the system with the second correct twin (Baby II), whose records were also in the department occupancy list.

Results: An error occurred in the interface whilst merging the records, and patient demography was not updated for clinical orders for Baby II. As a result, all new clinical orders for Baby II carried the non existing third baby's identity.

Conclusions: We emphasize that it is advisable to register all newborns as early on in life whilst still in the delivery room, with a permanent identification number as opposed to a temporary identification number to avoid any mismatching if patients records are to be merged or updated. Furthermore, steps that could help prevent such an event could be additional administrative staff to register newborns. However, we conclude, that it would be most helpful to introduce a Radio Frequency Identification (RFID) system based on a permanent identity number. If any discrepancies in patient information are detected, an alarm will be triggered during transfer of the baby from the delivery room to the designated Department. A RFID receptor is located at the exit of the delivery room.

While most literature available regarding Hospital Information Technology (HIT) and patient safety, mainly discusses mismatching of patients during medication and laboratory testing not much literature regarding the process of registering newborns as a source of patient mismatching has been found. The authors feel that there is a need to further investigate this aspect as it is a source that can affect not only accuracy in the Electronic Patient Record (EPR) but furthermore has the impact to change the course of a life and set tone for that person's future.

1. Introduction

Mismatching of newborns electronic patient records can lead to incorrect diagnoses and treatment. In most hospitals over the world where Electronic Patient Records (EPR) are implemented, EPR misidentification errors mostly occur during the pre-registration phases of the newborns in the Hospital Information System (HIS) [1]. Lately, we have examined this vital and challenging issue in the Neonatal Intensive Care Unit together with our Hospital Information Technology (HIT) department and have introduced appropriate procedures. These procedures include registration of the newborns as early as the first moments of life with a permanent patient identification number so that very little or no corrections or changes will be made to the infant's particulars in the HIS. Proper patient and clinical test identification is essential for incorporating data such as laboratory results, radiology, etc. into the EPR. This can be a difficult task as there are many different data sources to be integrated into the EPR.

In this paper we discuss a case of a near "incident" that could have occurred if not for the awareness of the neonatologist in the NICU. The consequences would have resulted in an incomplete EPR making it difficult for the staff treating the baby to access his records, thus the treatment would have been delayed or even dangerous.

2. Background

Poria Medical Center is an accredited 318 bed government general teaching hospital in Israel with state of the art HIT and systems. There are approximately 1000 computer end users with around 600 work stations over 35 medical departments including outpatient facilities, operating rooms, delivery rooms, neonatal and neonatal intensive care unit, medical laboratories and radiology institute. Digital computers are incorporated into specialized clinical instruments including sophisticated digital devices such as fetal monitors, heart monitors, imaging equipment and laboratory equipment. Most of these devices are fully integrated with clinical management and operational systems. All clinical processes in the hospital are a result of integration of both computer systems and medical records that have resulted in a mostly paperless environment.

The course of care of the baby in the delivery room and the department of neonatology demands optimal synchronization between the baby, midwife, neonatologist, nurses, equipment, medications, supplies, and the delivery room for the medical case to be successful. If any required element is missing or incorrect, the case will be delayed, the patient can be harmed, or the cost of the case can expand well beyond what is expected or necessary.

Patient information is recorded on a SAP system ISH-m.e.d module based ERP (Enterprise Resource Planning) program referred to as NAMER being the main clinical platform. SAP's client/server software package - R/3, offers the potential to integrate the complete range of an enterprise's processes and functions in order to present a holistic view of the business operations from a single information and IT architecture [2]. As an ERP, the SAP system affords the hospital use of a system of integrated applications to manage the entire business [3].

There are applications integrated to the SAP system by Health Level Seven (HL7) standard interfacing used in communicating between itself and other systems such as laboratories, and finance and accounting; and Digital Communications in Medicine (DICOM) for programs such as, PACS (Radiology), Obstetrics & Gynecology and neonatology imaging, etc. Among these are significantly essential diagnostic and treatment programs. The SAP system manages patients from their first visit to the hospital, whether it is ambulatory, emergency or elective, until his discharge including accounting.

All patient medical and administrative data are recorded in the SAP system.

Similar technology exists in many hospitals throughout the world, but as opposed to the SAP system at Poria Hospital some of the technologies do not include Modality work list capability to ensure that the patient identification information matches that on the HIS exactly. Matching is done using patient social security number and name, with manual intervention to resolve discrepancies [4]. In these cases where matching is done manually the system may be more prone to error as the data for similar names are based on the patient's current name in the EPR. In hospital information systems newborns are often named similarly, thus, at the time of a patient matching event the patient names may be very similar but the PID differs and can eventuate in patient mismatching [5].

The Neonatal Intensive Care Unit (NICU) population includes infants who are acutely ill or premature, and who are often unstable, the NICU is a highly technical specialized unit in a hospital that provides medical and nursing care and technological support [6]. The nature of work in this department is fast paced and every second in the NICU and in the delivery room has the potential to impact change in the course of a life and set tone for that person's future. In healthcare systems failures may be caused by sound-alike names and