

Patient Safety Tip of the Week

May 22, 2018 Hazardous Intrahospital Transport

We've identified the radiology suite as a high-risk area for untoward incidents in many of our columns, noting that most such incidents have little to do with the radiologic procedure being done. It simply reflects that many vulnerable patients with complex medical problems need to go to radiology, where many of the safety features we use elsewhere may slip through the cracks.

A recent report from the California Department of Public Health ([CDPH 2018](#)) illustrates the problem. A patient had been admitted after being found on the floor and noted to be in atrial fibrillation. He was placed on telemetry and had orders for serial EKG's and cardiac enzymes. It is not clear from the report whether the atrial fibrillation was persistent but subsequent EKG's apparently showed PVC's with trigeminy. A nurse notified his physician about the trigeminy and he was begun on oxygen 2 L/min.

He was scheduled for an MRI scan of the head (reason not provided in report). The nurse apparently contacted the physician, who ok'd sending the patient for the MRI, though it did not appear the physician realized the patient would be transported without telemetry monitoring.

No RN accompanied the patient to the MRI suite and he was not monitored in transit nor connected to telemetry on arrival at the MRI suite. The MRI technician did call the telemetry unit and asked a nurse whether the patient needed monitoring and the answer was "no".

The patient was initially advanced into the MRI machine but was pulled out when he complained of shortness of breath. He sat up and was placed on high flow oxygen again but agreed to attempt the MRI again. He then asked to be pulled from the MRI again. As the MRI tech moved the patient back to the hallway and assisted him getting back in bed, the patient had a cardiac arrest. A code was called but attempts at resuscitation were unsuccessful.

The hospital's policy on intrahospital transports had been revised about two years earlier to enable registered nurses to utilize clinical criteria to discontinue telemetry for select patients for transport to and during a test.

The hospital, in its POC (plan of correction), again revised its policy and protocol for transport of monitored patients. It would require a physician's order stating that the patient could be transported without monitoring. If telemetry or other form of monitoring is to be continued, an RN must accompany the patient to the receiving area. The POC

also included appropriate dissemination of the revised policy, inservice training, and an audit of subsequent transports of telemetry patients.

Though the hospital POC mentions the hospital uses patient safety tools like the Lean Daily Management Huddle on each nursing unit and multidisciplinary hospital Safety Huddles, there is no mention whether the hospital utilizes checklists like the “Ticket to Ride”. We have highlighted “**Ticket to Ride**” in multiple columns (see list below). It was originally started to ensure that patients being transported had adequate oxygen supplies, since some studies showed that over half of patients transported to sites like the radiology suite ran out of oxygen.

It’s worth reiterating many of the points in our August 25, 2015 Patient Safety Tip of the Week “[Checklist for Intrahospital Transport](#)”. Most of the literature on the risks associated with intrahospital transport have dealt with critically-ill patients. While incidents do occur during intrahospital transport of non-ICU patients, those from ICU’s are the most vulnerable. The percentage of ICU patients needing such intrahospital transfer probably depends on a host of factors, such as nature of the patient population, imaging capabilities, etc. One study ([Van Velsen 2011](#)) noted that about a third of ICU patients required intrahospital transports. The literature also suggests that the risk of incidents and adverse events during transports is also related to the time duration of the transport. Hence, events such as CT scanning tend to be associated with more incidents because they require more time ([PPSA 2005](#)). We’ll also bet that the percentage of incidents related to transports to the MRI suite has been increasing as MRI scanning has superseded CT scanning for so many conditions.

The overall rate of incidents during intrahospital transports is difficult to glean from the literature. In our September 16, 2008 Patient Safety Tip of the Week “[More on Radiology as a High Risk Area](#)” we noted studies from the 1980’s and 1990’s that showed rates of transport incidents as high as 70%. A paper by Smith et al ([Smith 1990](#)) noted adverse events during 34% of all ICU transports but transport of ICU patients to the CT suite was associated with a 71% incidence of adverse events. Those high rates of transport incidents have probably diminished somewhat. Some authors had previously noted an incidence of 3.7% ([Van Velsen 2011](#)) but when they prospectively monitored transports ([Brunsveld-Reinders 2015](#)) they found that in 26% of 503 transports to Radiology one or more incidents occurred.

Probably the most comprehensive review of incidents related to intrahospital transport came from the Australian Incident Monitoring Study in Critical Care, reported by researchers from Australia and Johns Hopkins ([Beckmann 2004](#)). They found 191 incidents related to intrahospital transport from 37 Australian ICU’s between 1993 and 1999. Roughly a third (31%) of the incidents had serious adverse outcomes, with major physiological derangement in 15%, physical/psychological injury in 4%, death in 2%, and prolonged hospital stay in 4%. In addition, patient/family dissatisfaction occurred in 7%. The site to which the transport occurred was evenly split between the Radiology suite and the OR, with some transports to the ward, ER, or other sites. And, of course, we refer you back to our October 22, 2013 Patient Safety Tip of the Week “[How Safe Is](#)

[Your Radiology Suite?](#)” for a comprehensive discussion of all the things that can go wrong when a patient is sent to the radiology suite.

We also refer you back to our August 25, 2015 Patient Safety Tip of the Week “[Checklist for Intrahospital Transport](#)” for discussion about the many factors contributing to incidents related to intrahospital transports. These include equipment failures, oxygenation issues, battery/power issues, and things like attention to patient hydration. And don’t forget the problems that arise when sending diabetic patients off for substantial periods of time (what to do with their insulin, planning for meals, etc.). We refer you to the Netherlands study itself ([Brunsveld-Reinders 2015](#)) to actually see the checklist they created for intrahospital transports. The article also addresses transport team composition (which may vary depending upon whether the patient is ventilated or on pressors or inotropes) and education/training needs for members of the transport team.

A good “Ticket to Ride” type checklist for intrahospital transport should cover all three phases of transport: pre-transport, during-transport, and post-transport ([Jarden 2010](#), [Brunsveld-Reinders 2015](#))

Of course, when doing an RCA (root cause analysis) of such cases, there are always two other questions you should ask:

1. Was the telemetry indicated in the first place?
2. Was the MRI necessary?

Though we cannot answer these two questions based on the limited amount of information in the CDPH report, the questions are still important. The first question is important since one key component of most hospital alarm management programs now is reducing the use of unnecessary telemetry (see our Patient Safety Tips of the Week for October 2014 “[Alarm Fatigue: Reducing Unnecessary Telemetry Monitoring](#)”, August 16, 2016 “[How Is Your Alarm Management Initiative Going?](#)”, and October 17, 2017 “[Progress on Alarm Management](#)”).

The second question is important because we often see transports from ICU’s for imaging or other testing that are really of marginal value in patient management. In our August 25, 2015 Patient Safety Tip of the Week “[Checklist for Intrahospital Transport](#)” we noted a commentary by Shirley and Bion ([Shirley 2004](#)) which noted the importance of making the **decision about whether to transport a patient**. They note that such decision “should be made by a senior, experienced and appropriately skilled clinician who remains responsible for the conduct of the transfer”. The **potential benefits** of a transport must be critically weighed against the **potential risks**. Beckmann et al. ([Beckmann 2004](#)) cite studies suggesting that care plans were changed for patients after such transports in only 24-39% of cases. So one really needs to consider how likely the imaging study (or other procedure the patient may be going for) is really going to change patient management.

In our August 25, 2015 Patient Safety Tip of the Week “[Checklist for Intrahospital Transport](#)” we discussed “**the 5 W’s**” of intrahospital transport ([Day 2010](#)). The first “W” is “**Why**” or “Why does the patient need to leave the ICU for the procedure?”. Important

questions to ask here are “Are there bedside alternatives for the procedure? And “Is the patient’s condition stable?”. If the patient is considered unstable, the next questions are “Is the transport for a lifesaving intervention?” and “Is the transport to a diagnostic test pivotal to decision for emergent plan?”. Day’s second “W” is “**Who**”. This included both who is the patient and who will be caring for the patient and, importantly, will a handoff be required? The third “W” is “**What**” and refers to equipment, airway, ventilator support, circulatory support, and special considerations (eg. spine stability, intracranial pressure monitors, etc.). Under the fourth “W” for “**When**” Day discusses considerations about coordinating with the timing of the test or procedure (eg. fasting or withholding anticoagulants for procedures), renal protective protocols for contrast-using procedures, and collaborating with other healthcare providers. The last “W” is for “**Where**” which includes details about the route to be taken, issues regarding MRI safety if going for MRI, etc.

Intrahospital transports, whether involving critical care patients or others, need to be undertaken with considerable planning. You need to ensure that you have systems in place to ensure the safety of the patients and tools like the “Ticket to Ride” checklists may facilitate safe transports.

Some of our prior columns on the “Ticket to Ride” concept:

- April 8, 2008 [“Oxygen as a Medication”](#)
- November 18, 2008 [“Ticket to Ride: Checklist, Form, or Decision Scorecard?”](#)
- August 11, 2009 [“The Radiology Suite...Again!”](#)
- March 13, 2012 [“Medical Emergency Team Calls to Radiology”](#)
- August 25, 2015 [“Checklist for Intrahospital Transport”](#)
- September 1, 2015 [“Smarter Checklists”](#)
- November 2016 [“Oxygen Tank Monitoring”](#)
- February 2018 [“Oxygen Cylinders Back in the News”](#)

Some of our prior columns on patient safety issues in the radiology suite:

- October 16, 2007 [“Radiology as a Site at High-Risk for Medication Errors”](#)
- February 19, 2008 [“MRI Safety”](#)
- September 16, 2008 [“More on Radiology as a High Risk Area”](#)
- October 7, 2008 [“Lessons from Falls....from Rehab Medicine”](#)
- October 2008 [“Preventing Infection in MRI”](#)
- March 17, 2009 [“More on MRI Safety”](#)
- March 2009 [“Risk of Burns during MRI Scans from Transdermal Drug Patches”](#)
- August 11, 2009 [“The Radiology Suite...Again!”](#)
- January 2010 [“Falls in the Radiology Suite”](#)
- August 2010 [“Sedation Costs for Pediatric MRI”](#)
- January 25, 2011 [“Procedural Sedation in Children”](#)
- February 1, 2011 [“MRI Safety Audit”](#)

- October 25, 2011 [“Renewed Focus on MRI Safety”](#)
- March 13, 2012 [“Medical Emergency Team Calls to Radiology”](#)
- August 2012 [“Newest MRI Hazard: Ingested Magnets”](#)
- October 22, 2013 [“How Safe Is Your Radiology Suite?”](#)
- February 25, 2014 [“Joint Commission Revised Diagnostic Imaging Requirements”](#)
- July 2014 [“New MRI Risks: for Staff!”](#)
- July 1, 2014 [“Interruptions and Radiologists”](#)
- November 2014 [“More Radiologist Interruptions”](#)
- October 21, 2014 [“The Fire Department and Your Hospital”](#)
- June 23, 2015 [“Again! Mistaking Antiseptic Solution for Radiographic Contrast”](#)
- August 25, 2015 [“Checklist for Intrahospital Transport”](#)
- March 22, 2016 [“Radiology Communication Errors May Surprise You”](#)
- August 2016 [“Guideline Update for Pediatric Sedation”](#)
- October 2016 [“MRI Safety: There’s an App for That!”](#)
- January 17, 2017 [“Pediatric MRI Safety”](#)
- August 8, 2017 [“Sedation for Pediatric MRI Rising”](#)
- November 14, 2017 [“Tracking C. diff to a CT Scanner”](#)
- March 2018 [“MRI Death a Reminder of Dangers”](#)
- March 2018 [“Cardiac Devices Safe During MRI But Spinners!?”](#)
- April 2018 [“Radiologists Get Fatigued, Too”](#)
- May 2018 [“Cost of Interrupting a Radiologist”](#)

Some of our prior columns on patient safety issues related to MRI:

- February 19, 2008 [“MRI Safety”](#)
- March 17, 2009 [“More on MRI Safety”](#)
- October 2008 [“Preventing Infection in MRI”](#)
- March 2009 [“Risk of Burns during MRI Scans from Transdermal Drug Patches”](#)
- January 25, 2011 [“Procedural Sedation in Children”](#)
- February 1, 2011 [“MRI Safety Audit”](#)
- October 25, 2011 [“Renewed Focus on MRI Safety”](#)
- August 2012 [“Newest MRI Hazard: Ingested Magnets”](#)
- October 22, 2013 [“How Safe Is Your Radiology Suite?”](#)
- October 21, 2014 [“The Fire Department and Your Hospital”](#)
- August 25, 2015 [“Checklist for Intrahospital Transport”](#)
- August 2016 [“Guideline Update for Pediatric Sedation”](#)
- October 2016 [“MRI Safety: There’s an App for That!”](#)
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