

System to Coordinate Clinical Follow-up of Patients Presenting for Emergency Center Care after Interventional Radiology Procedures

Kevin W. McEnery, MD, Sanjay Gupta, MD, Joseph R. Steele, MD, Michael J. Wallace, MD Division of Diagnostic Imaging, The University of Texas MD Anderson Cancer Center, Houston, TX

PROJECT AIM

Indentify and assess 100% of patients presenting to the Emergency Center (EC) during the seven days following Interventional Radiology procedures for postprocedure complication.

PURPOSE

A fundamental component of an Interventional Radiology(IR) Quality Assurance(QA) program is monitoring for both short and long-term complications following interventional procedures. While most patients with post-procedure complication present to the EC, there was not an efficient method to proactively indentify these patients. This adversely impacted involvement of the IR clinical staff in post-procedure care. In some cases, hospital admissions for complication treatment occurred without IR staff knowledge.

METHODS

An automated notification agent was developed to enable the generation of email notification messages leveraging a web services-based Electronic Medical Record (EMR) architecture (Fig1). The system tracked patients who had completed IR procedures in the prior seven days. Then, the system continuously monitored the EC patient arrival census and correlated new patient arrivals against the list of recent interventional patients.



Figure 1. Automated E-mail Process

Upon identification of a patient of interest, the system would initiate an email message sent to IR fellows, the staff member of record for the interventional examination as well as administrative staff for entry into a tracking spreadsheet (Fig. 3). The IR staff member would then contact or visit the EC to determine whether the patient's EC presentation was in any way related to the interventional procedure of record and coordinate immediate intervention if this was deemed clinically necessary.

RESULTS

- Between 12/1/2010 and 10/31/2011, system recorded 280 instances of patients presenting to EC following IR procedures (Fig. 2).
- System validated to initiate clinical notification e-mail within five minutes of patient arrival.
- Interventional radiology clinicians are advised to delay contact for several minutes to allow EC physicians to assess the patient.
- Notification system remains continues to actively monitoring patient activity and ensure active participation of interventional radiologists in post-procedure care.



Figure 2. Notification Messages Generated



Figure 3. Notification Results Tracking Spreadsheet

GENERALIZATION OF PROCESS

Although this system was automated utilizing the institution's EMR infrastructure, components of the system could be efficiently implemented in most institutions. Requirements include daily report of EC census and RIS-based procedure information. A daily manual review of EC patients for possible complications could provide the basis for developing further automation in subsequent iterations.

Entry-Level System Requirements:

- Radiology Information System (RIS) provides list of patients with IR procedures in past seven days.
- EC Census or alternative poll RIS for patients imaged in the EC.
- Cross reference patient lists in spreadsheet.
- Spreadsheet to store outcome information.

BENEFITS

- Provides an active clinical presence with EC clinical staff for active availability to assist with care of patients with recent IR procedures.
- Demonstrates commitment to continuity of care to patient's referring physicians.
- Allows identification of post-procedure complications more accurately and this data can be used for peer-review purposes and quality improvement initiatives(Fig. 4).
- Increasing the visibility of IR staff for consideration of involvement in the management of presenting patients for whom the IR staff has not has prior contact. Specific quantification of the benefit is under current investigation
- Constant monitoring of the EC Census for recent IR is automatically performed by computer system freeing personnel for other patient care tasks.
- Low cost of implementation utilizing e-mail based process.

Jenneseacion							
ClinicStation 4.0.0 (Build 19)	Current User: MCENERY,KEVIN	Logged in at: 11/15/2011 3:04 Pt	1				Logout Lock
PATIENT: By MRN 👻 MRN:	Query						Settings OHelp
	DI Radiology Reports:	4			(151.0cm	61.9kg BSA: 1.	61m² 11/15/11)
Patient	Desertue	Data	Chalun	Deep Northeas	Association	DestraDe	Ordering Dr
	BX. LIVER US	10/21/2011 08:48 Yes	Signed	IR3808	Accession	10653 · MURTH.	10135 - RAMIRE
- 🛅 Allergies/Reactions: 1	P-NEW PT LEVEL 4 COMP 99204	10/20/2011 08:37 Yes	Signed	IB9904		12463 - PATEL	10135 - BAMIRE
— 🛅 DI Unread Radiology Exams: 1	CT ABD & PELVIS W/CONTRAST	10/14/2011 11:15 Yes	Signed	CT1607		12329 - WAGNE	10135 - BAMIRE
DI Radiology Reports: 4	CT THOBAX W/CONTBAST	10/14/2011 11:15 Yes	Signed	CT0561	_	12329 - WAGNE	10135 - BAMIRE
			olg.log	0.000			
E Caboratory: 47							
Blood Bank/Transfusion: U							
Pathology Reports: 2							
Anesthesia Perioperative Records: 0							
Anescriesian enoperative mecords, o							
Conned Documents: 47	BX, LIVER US 10/21/2011 08:48			View Images			
⊕ Pulmonary: 0	Complications		d average in the second se			<u>. 1</u>	
- 🛅 Vital Signs: 2	Existing. (2) 10/21/2011 11:22:54	AM Non Y Auu. Unrelate	d event			<u> </u>	
		Ranking:		Comm	ents:		<u>*</u>
🛨 🛅 Medications: 2							*
- 🛅 Tobacco Treatment Plans: 0	The total time for mo	derate codation was 35 m	inutos				_
- 🛅 Flow Sheet: 0			matos.				
Patient Schedule: 6	Procedure: I have re	viewed the History and Pl	nysical dictated	d by the Mid-Lev	el		
Patient Surgery Schedule : 0	Practitioner/Fellow.						
Patient RadOnc Schedule: 0							
Involved Providers: U	Ine procedure, risks, indications and alternatives were explained. All questions were						
	 answered and inform ultrasound of the live 	r was performed of the en	and the patier	nt placed supine	. A cursory		
		r was performed of the op	igastrum.				
2 Patient	A 2 cm hypoechoic le	esion was identified in seg	ment III of the	liver. The overly	ing skin was		
🕽 Lists/Schedules	prepped and draped.	Local anesthetic was adr	ninistered and	an 18-gauge ne	edle was		
🖉 Inbox	introduced into the le	sion under real-time ultras	sound guidance	e. The 22-gauge	coaxial place	d	
×	needles were utilized	I to obtain tissue which wa	s inadequate f	or cytologic anal	ysis.		
	Subsequently, 20-ga	uge core biopsies were pe	rrormed incluc	aing a touch impr	nt analysis		
	dopartmont in stable	acypical cells. The devices condition	were removed	u anu me patieni	rieirtue		-

Figure 4. Complications added to patient IR QA record via entry process Integrated into institution's EMR 00000

CONCLUSIONS

- Described notification system has proven 100% effective in notification of potential complications related to recent IR procedures and remains in daily use.
- Provides an effective means for radiologists to be pro-active in the identification of potential complications.
- Enables radiologists to proactively monitor patient activity and be an active participant in the clinical delivery process.
- Low cost entry-level implementation could allow efficient adoption of similar QA process at other institutions.

ACKNOWLEDGEMENTS

The authors thank Jennifer E. Charles for administrative management of the QA process and Kelly R. Duggan for expertise in exhibit preparation.