

An aerial photograph of a densely populated city, likely Jerusalem, showing a large, multi-story hospital building in the center. The city is built on a hillside, with numerous residential buildings and green spaces. The sea is visible in the background under a clear sky.

Electronic reminder for preoperative prophylactic antibiotics

Arieh Eden, Yuri Barak, Reuven
Pizov

Institute of Health-Care Improvement

- **The 100k Lives Campaign**
 - **Rapid-response team**
 - **Acute MI**
 - **Medication reconciliation**
 - **Prevention of central line infection**
 - **Surgical-site infection**
 - **ventilator associated pneumonia**

Surgical Site Infection

- Clinical Relevance
 - Occurs in 5-20% of elective surgical cases
 - Doubles mortality
- Prevention with Antibiotic Prophylaxis
 - Selection of appropriate antibiotics according to surgery and epidemiology
 - Timing of the 1st dose should be within the hour preceding surgical incision
 - Prophylaxis should continue for no more than 24 hours

Computerized reminders & antibiotic prophylaxis

- Electronic reminders ↑ compliance 82% → 89%
In ambulatory surgery (~15,000) (Wax A&A 2007)
- Computerized feedback ↑ timely antibiotics from 69% → 92% (O'Reilly A&A 2006)
- Electronic reminders for 2nd dose in prolonged surgeries (287) 20% → 57% (St. Jacques Surg Inf 2005)
- Automated preoperative prescription ↑ 51% → 95% (Webb Am J Surg 2006)

Study Aim

- Develop a computerized reminder within the anesthesia information management system
- Evaluate whether such a reminder will improve the rate of timely antibiotic prophylaxis

Study Design

- Quality improvement program, Retrospective, observational, before & after
- IRB approval, waived informed consent
- Limited to: Orthopedic, Vascular & Cardiac Surgery

Computerized Reminder

- Two step
 - Initial reminder at the start of anesthesia
 - Second reminder after recording “end of anesthesia induction process”

The screenshot shows a software window titled "Event" with a "Details" tab. The window displays a reminder for "EM_Ab_InductionComplete" with a value of 1 and a time of 26/08/2009 09:41. The reminder is marked as "Important" and asks "Have you given antibiotic prophylaxis?". Below the reminder is a "Comments" section with a "Save" button. A dropdown menu is open, showing options: "Antibiotic Given", "Antibiotic Not Required", and "Antibiotics". The bottom of the window features a toolbar with icons for RMS, IV Access, PreO2, FLUIDS, DRUGS, Intub, S, and Artifact.

Event Details Value: 1 Time: 26/08/2009 09:41

EM_Ab_InductionComplete Important

Have you given antibiotic prophylaxis?

Comments

Save

Antibiotic Given
Antibiotic Not Required
Antibiotics

RMS IV Access PreO2 FLUIDS DRUGS Intub S Artifact

Outcome

- Appropriate prophylaxis
 - if administered within an hour before incision
- Inappropriate
 - **Early** if administered more than one hour before surgery
 - **Late** if administered after skin incision
 - **Missing** if antibiotics were not administered at all

Data Collection & Analysis

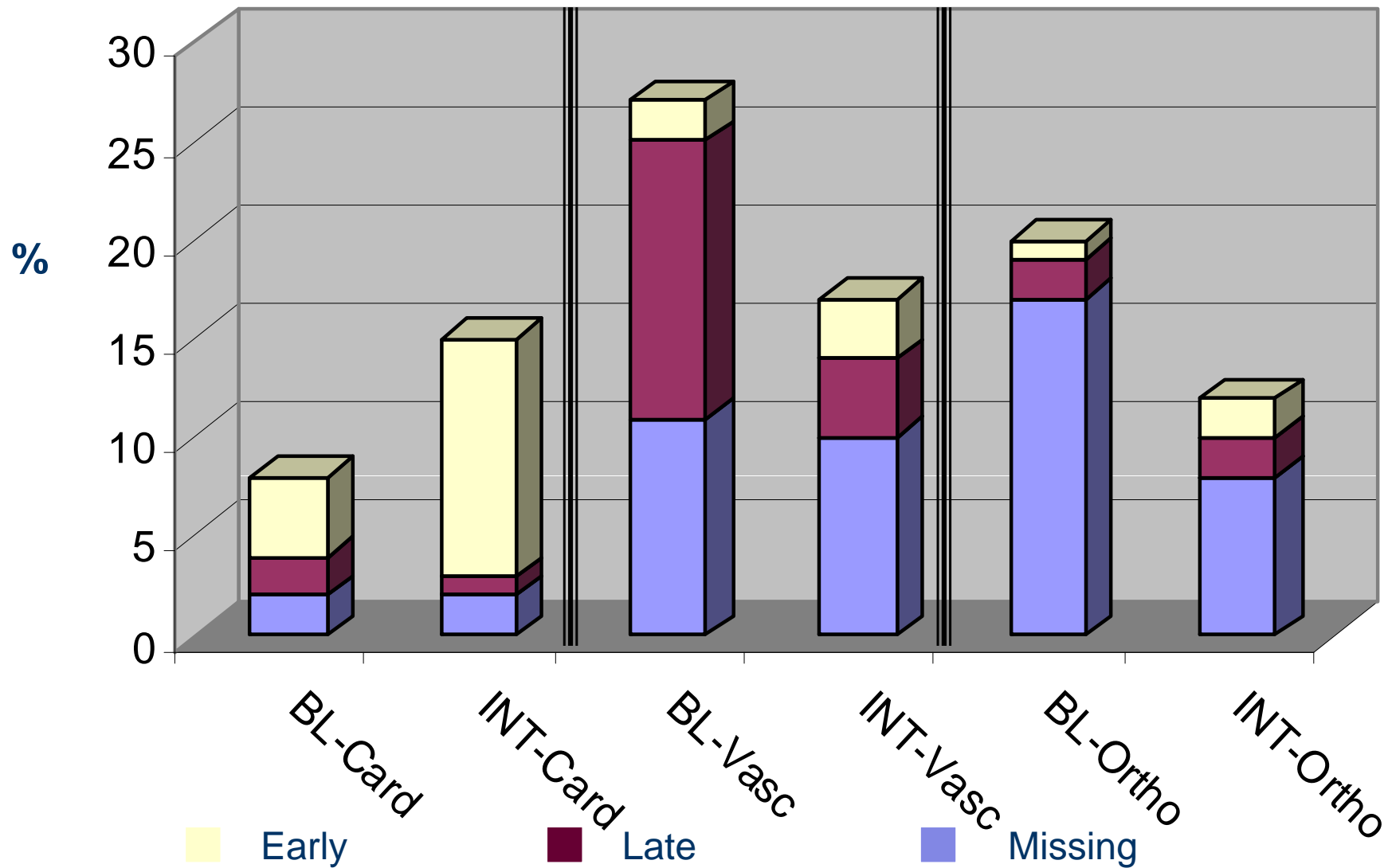
- Data collected with inbuilt tool (Query wizard)
 - Baseline - four months
 - Intervention – seven months
- Demographics, type of surgery, time & type of antibiotic prophylaxis & start of surgery (skin incision)
- Proportions compared using Chi square $p < 0.05$

Results

- We evaluated 1342 cases
 - Baseline 494
 - Intervention 848
- Overall appropriate antibiotic prophylaxis did not change.
 - Orthopedic ↑ (P=0.02)
 - Vascular ↑ (P=0.008)
 - Cardiac ↓ (P=0.043)

		Cardiac	Vasc	Ortho	Total
Before Electronic Alert (Baseline)	Missing	5 (2%)	11 (11%)	28 (17%)	44 (9%)
	Late	4 (2%)	15 (14%)	3 (2%)	22 (4%)
	Early	10 (4%)	2 (2%)	2 (1%)	14 (3%)
	Approp	207 (92%)	76 (73%)	131 (80%)	414 (84%)
	Total	226	104	164	494
After Electronic Alert (Intervention)	Missing	6 (2%)	20 (10%)	21(8%)	47 (6%)
	Late	5 (1%)	7 (4%)	4 (2%)	16 (2%)
	Early	48 (12%)	5 (3%)	6 (2%)	59 (7%)
	Approp	338 (85%)	162 (84%)	226 (88%)	726 (86%)
	Total	397	194	257	848

Total Errors in Antibiotic Prophylaxis



Conclusions

- Electronic alerts did not improve overall administration of prophylactic antibiotics
- In different settings different patterns emerge
 - Cardiac: ↑ EARLY, long preparation & ↑ awareness at BL
 - Vascular: ↓ LATE, alert led to ↑ awareness
 - Orthopedics: ↓ MISSING, alert led to ↑ awareness

Failure of computerized clinical systems

- Increased mortality in pediatrics following implementation of CPOE (Han Pediatrics, 2005)
- Failure of computerized lab ordering due to poor implementation (Peute, 2009)
- Cedar Sinai experience
 - 2002 Alert overload
 - 34 M \$ scraped

Discussion

- Alert fatigue?
 - Local compliance high for computerized alerts (Eden, A&A 2009)
- Specific & different types of surgery
 - Cardiac surgery prep > 1hr
 - Vascular & Orthopedics ➤ Switch of responsibility to anesthesiologist
- High initial rate of appropriate antibiotic prophylaxis



arieed@clalit.org.il