

Improving Antibiotic Prescribing in Interventional Radiology Using Clinical Decision Support Tools to Assess Penicillin Allergies

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ABSTRACT

Background: Patients labeled with penicillin (PCN) allergies often receive alternative antibiotics, leading to increased cost, higher risk of adverse events, and decreased efficacy of procedural prophylaxis. However, most of those patients can tolerate a cephalosporin. Providers in the University of Washington Medical Center – Montlake (UWMC-ML) Interventional Radiology (IR) department frequently administer a pre-procedure prophylactic cephalosporin (ceph). We worked with the clinicians in IR to develop tools to allow them to assess PCN allergies, risk stratify the reaction, make the most appropriate antibiotic choice, and update the patient's allergy documentation.

Methods: We identified all procedures for which antibiotics were administered in IR between 1/1/2018-9/27/2020 using pharmacy and radiology records. We excluded procedures for which a fluoroquinolone is recommended, a carbapenem was administered as prophylaxis, or the antibiotic was not ordered in IR. Leaf, a self-service tool to query the UWMC electronic medical record, was used to identify patients with penicillin or cephalosporin allergy labels at any time in the outpatient medical record system. On April 29, 2020 we implemented use of new Clinical Decision Support (CDS) tools, including handouts and an online assessment (<https://tinyurl.com/IRPCNAIIAssess>) to guide antibiotic decision making by clinicians in IR (Figure 1). This work was approved by the UWMC IRB (STUDY00009768).

Results: From 1/2018 to 9/2020, 1084 patients underwent 1855 procedures in IR. Of those, 724 patients underwent 1002 procedures which met our inclusion criteria (Figure 2). Prior to our intervention, 22.4% [n=22] of patients with PCN allergies received a PCN or ceph, compared to 90.8% [n=603] of patients without a reported PCN or ceph allergy. Since implementation, 42.1% [n=8] of patients with PCN allergies received a PCN or ceph, compared to 95.1% [n=136] of patients without a reported allergy (Figure 3). The CDS tool has been used to evaluate 18 patients, of whom 15 had penicillin allergies. 9 patients safely received a cephalosporin (4 were delabeled, 4 reported a history of mild reactions, and 1 reported a history of an immediate IgE mediated response to penicillin but safely received cefazolin). 1 patient was delabeled, but given vancomycin due to a history of MRSA colonization or infection.

Conclusions. Tools to assess penicillin allergies aid in the usage of appropriate first-line antibiotics in patients with penicillin allergies. Delabeling penicillin allergies via IR could provide a much broader impact on patient care than on just their current procedure.

FUTURE DIRECTIONS

We will continue to collect data on the use and results of the beta-lactam allergy assessment including safety, delabeling, usage of antibiotics, and potential barriers to using these guidelines.

We are also developing CDS tools for use in the general population, and will presenting that work at the Idea Incubator 2020!

METHODS

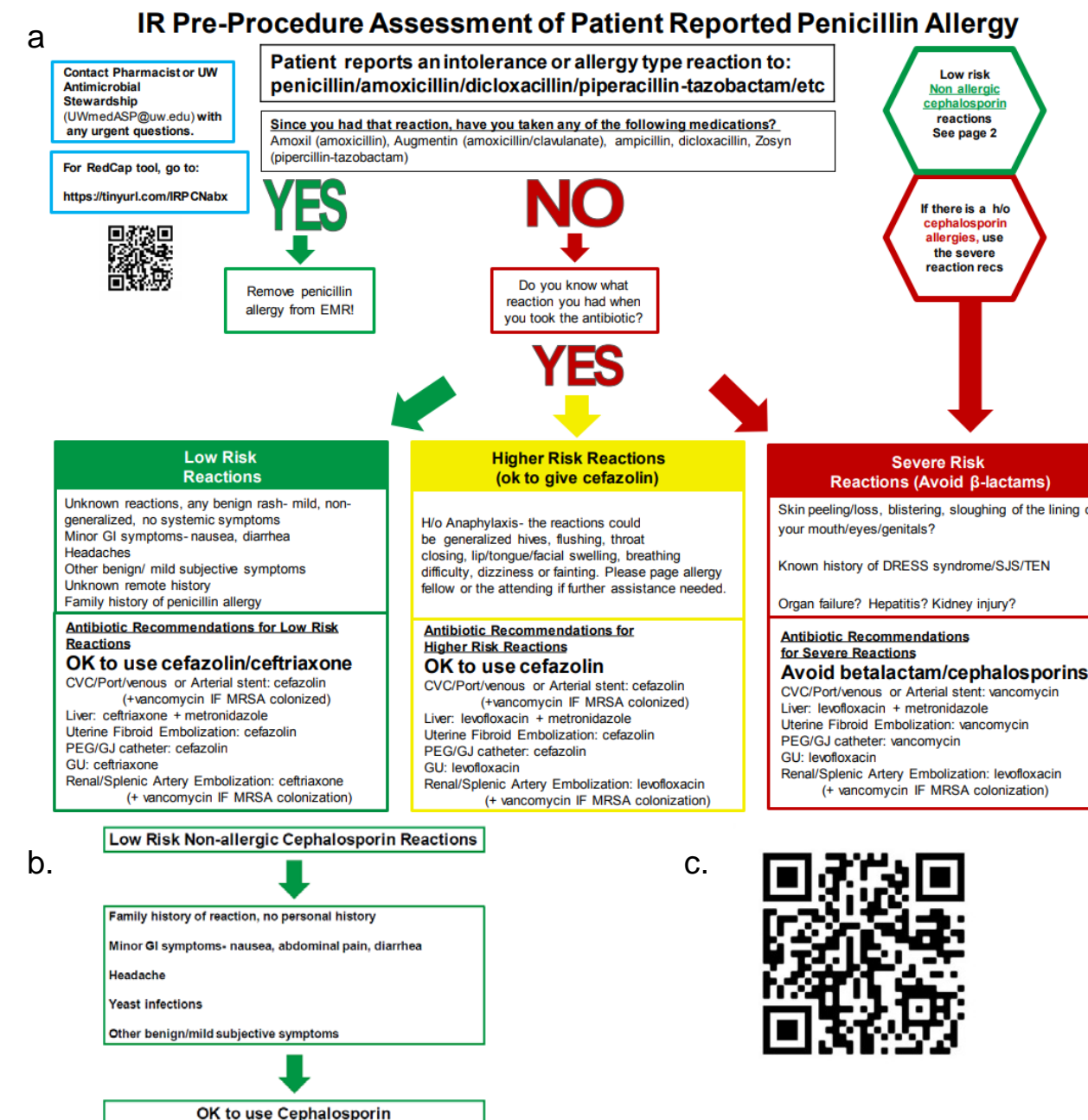


Figure 1. CDS Tools for IR Providers. (a) Allergy reaction risk stratification guideline. (b) Cephalosporin risk stratification guideline. (c) QR code for online assessment

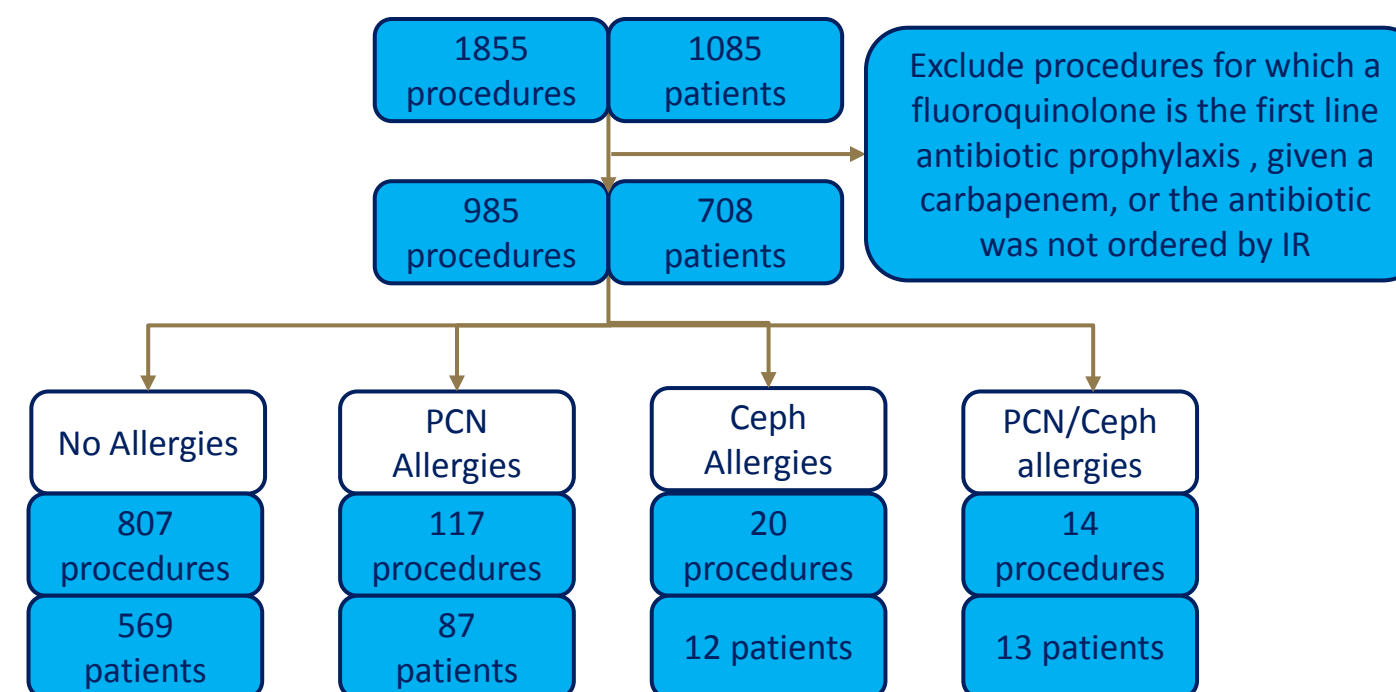


Figure 2. Patient population. Number of patients undergoing the number of procedures from 1/1/2018-9/27/2020.

RESULTS

a.	No beta-lactam allergy	+ PCN allergy	+ceph allergy	+PCN/ceph allergy
# received PCN/ceph	603	22	5	2
# received alternative abx	61	76	12	9
% received PCN/Ceph	90.8 %	22.4 %	29.4 %	18.2%

b.	No beta-lactam allergy	+ PCN allergy	+ceph allergy	+PCN/ceph allergy
# received PCN/ceph	136	8	1	1
# received alternative abx	7	11	2	2
% received PCN/Ceph	95.1 %	42.1 %	33.3%	33.3%

Figure 3. Antibiotic Use in IR (a) from 1/1/2018-4/28/2020, pre-implementation. (b) from 4/29/2020-9/27/2020, post-implementation.

a.	20 surveys started	18 surveys completed
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b.	No beta-lactam allergy	+ PCN allergy	+ceph allergy	+PCN/ceph allergy
# received PCN/ceph	0	9	2	2
# received alternative abx	1	3	1	1
% received PCN/Ceph	0%	75.0%	100%	66.7%
delabeled	NA	4	NA	1

Figure 4. Antibiotic Use in IR with use of CDS tool. (a) number of survey started and completed. (b) antibiotic use after use of CDS.

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