



Background

Patients (pts) who present to an Emergency Department (ED) with possible arrhythmia symptoms and are diagnostically inconclusive create a dilemma for ED providers. The decision to admit for inpatient monitoring or to discharge for outpatient evaluation is often arbitrary with no clear alternative.

Objective

The purpose of this study was to examine clinical efficiency to diagnosis in pts suspected of arrhythmia with the ability to apply ECG patch monitors prior to discharge from ED.

Methods

Single-site, quantitative evaluation study using retrospective chart review. In 2018 we implemented patch application as a discharge option for pts in the ED where providers were concerned that an arrhythmia may be associated with the complaint. The 48-hour ECG patch monitor (CAM, Bardy Diagnostics, Seattle), referred here as patch was placed on 433 pts with symptoms of suspected arrhythmias. Pts were instructed to return the patch for analysis and make a follow up appointment with a cardiologist. Report findings, time to diagnosis and ED readmission rates-within 30 days of initial visit were then categorized.

Figure 1: Patients Discharged with Patch: N=433
Aug 2018-July 2020



Returned patch (n=386, 89%) Unreturned patch (n=47, 11%)

Figure 2: Time of Patch Application

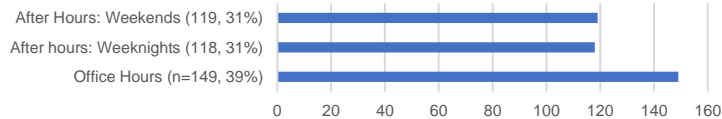
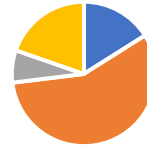
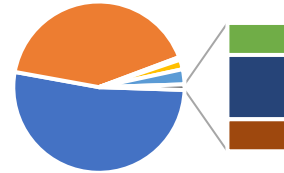


Figure 3: Returned Patches & Cardiology Follow-Ups (n=386 Patients)



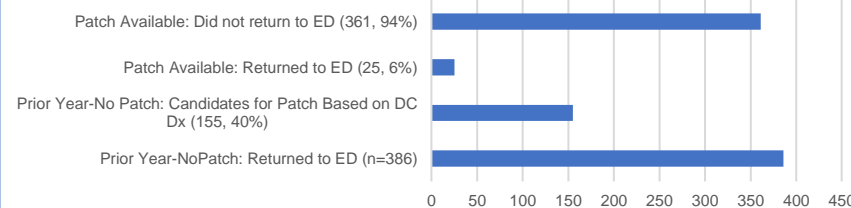
- With Established In-Facility Cardiologist (n=62, 16%)
- New Referral to In-Facility Cardiologist (n=220, 57%)
- With Out-of-Facility Cardiologist (n=28, 7%)
- No Established Cardiologist & Declined New Referral (n=76, 20%)

Figure 4: Follow-Up Tests and Procedures (n=386 Patients)



- No Additional Tests (n=202, 52%)
- Echo, Stress Echo, Nuc Med, CT (n=160, 41%)
- Cardioversions (n=2)
- Cardiac Caths (n=7, 2%)
- EP Ablations (n=12, 3%)
- Pacemaker (n=1)
- Implantable Loop Recorder (n=2)
- TAVR (n=1)

Figure 5: 30-Day Readmission to ED



Results

Fig.1, over 2 years (Aug 2018-July 2020), 433 pts were discharged with the patch and 386 were (89%) returned to clinic. **Fig.2**, patch placement occurred outside of clinic hours: Nights (118, 31%) and weekends (119, 31%) patients. **Fig.3**, of the 386 pts, 62 (16%) were established cardiac pts, 220 (57%) had no prior cardiology care resulting in new referral to our Cardiology/EP department, and 28 (7%) had prior cardiac care elsewhere. **Fig.4**, of the 386 returned patches, results potentially created: 160 additional tests (Echo, Stress Echo, nuclear medicine, and/or CT); 2 non-invasive procedures (cardioversion); and 23 invasive procedures (cardiac catheterization, EP ablation, pacemaker, ILR, TAVR). These total to 184 patients identified to have significant arrhythmias and most likely eliminated another ED visit and potential cost savings for those patients. For a cost comparison: According to consumer health ratings in 2018, an ED visit (code 99285) had a national average facility charge of \$1,118¹, compared with patch placement average cost of \$492, based on this facility's charge for patch application; or compared with a hospital stay mean cost of \$11,700 in 2016². The average time of ED discharge to diagnosis was 7 days over the 2-year period compared to a previous average of 21 days. **Fig.5**, ED readmission within 30 days from initial visit was limited to 25 of 386 study pts (6%) compared to readmission rates in the year prior to patch availability of 155 of 386 pts (40%) who had the same type of cardiac complaints, p<0.001.

Conclusion

ED adoption of ECG patch monitoring provided an alternative to hospital admission while decreasing time to diagnosis and dramatically reducing return ED visits. **For leaders who wish to implement:** Identify nurse champion with skills in planning, implementation, and follow-through; knowledge of EHR ordering; patience in training seasoned and new-hire staff; establish collaboration with outpatient cardiology and identify billing partner to monitor charges.

References

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- Freeman WJ (AHRQ), W. A. (December 18, 2018). *Overview of U.S. Hospital Stays in 2016: Variation by Geographic Region. HCUP Statistical Brief #246*. Agency for Healthcare Research and Quality, Center for Delivery, Organization and Markets. Rockville, MD: AHRQ. Retrieved from <https://www.hcup-us.ahrq.gov/reports/statbriefs/sb246-Geographic-Variation-Hospital-Stays.pdf>

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