

E-Consults: an effective way to decrease clinic wait times in Rheumatology

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Abstract

Background To evaluate the effect of E-consults on wait times and resource utilization for positive antinuclear antibody (ANA) referrals in outpatient rheumatology.

Methods We conducted a pre-post study of E-consult implementation for positive ANA referrals. We retrospectively reviewed “positive ANA” referrals from 1/2015-3/2017. A statistical process control chart was created to display monthly average wait times for in-person clinic visits and to identify special cause variation. Final Diagnoses, wait times and resource utilization were recorded and compared between E-consults and in-person referrals.

Results There were 139 referrals for positive ANA with 126 occurring after E-consult implementation in August 2015. Forty-four percent (55/126) of referrals were E-consults; 76% were resolved after initial electronic rheumatology recommendation. A control chart demonstrated special cause variation in the form of a shift from June 2016 – January 2017, suggesting a temporal association between decreased wait times and the implementation of E-consults. Eleven patients were diagnosed with ANA-associated rheumatic disease; the majority of patients (73%, 86/139) did not have a rheumatologic diagnosis. Overall E-consults utilized more labs than in-person visits, but this was not statistically significant. In-person visit utilized more imaging studies, which was statistically significant.

Conclusion E-consults are an effective way to address positive ANA consults without significant resource utilization and were temporally associated with decreased wait times for in-person visits.

Background

A common reason for referral to rheumatology is a positive antinuclear antibody (ANA) test. A US study reported positive ANA referrals result in diagnosis of ANA-associated rheumatic disease less than 10% of the time. ⁽¹⁾ With a shortage of rheumatologists in the US, ⁽²⁾ finding ways to address positive ANA referrals promptly can improve access for patients requiring in-person rheumatology evaluation.

Electronic consults (E-consult) allow access to specialists without an in-person visit, resulting in fewer inappropriate clinic visits, increased access to care and improved provider satisfaction. ⁽³⁾ This project aims to evaluate the resource utilization of E-consults and their effect on wait times for positive ANA referrals in a rheumatology clinic.

Methods

We conducted a pre-post study of E-consult implementation for positive ANA referrals. Our outcomes included wait times, diagnostic tests ordered and patients’ final diagnoses.

All referrals were placed through the electronic medical record (EMR); referring providers had the option of selecting either “E-consult” or “in-person visit” when placing a referral starting August 2015. A

rheumatologist reviewed all referrals and switched the type of referral if needed. For E-consults, the reviewer electronically replied to the referring clinician with recommendations. Rheumatology staff scheduled clinic appointments for in-person referrals.

We retrospectively reviewed positive ANA referrals to outpatient rheumatology from January 1, 2015 to March 31, 2017. We defined wait time for an in-person visit as the time from referral placement to rheumatology clinic appointment. E-consult wait time was defined as the time from referral placement to the rheumatologist's initial electronic response. Using an XmR statistical process control chart to account for random variation and identify special cause variation,⁽⁴⁾ we calculated the average monthly wait time for a positive ANA in-person visit. An unpaired T-test was used to compare wait times and resource utilization between visit types in total, and for each final diagnosis category.

Resource utilization was defined as labs and imaging ordered by the first rheumatology evaluation. Resource utilization was calculated per person and for each final diagnosis category.

At the time of review, patients' final diagnoses were recorded from the assessment/plan section of rheumatologist's most recent clinic note. Diagnoses were organized into ANA-associated rheumatic disease (AARD)⁽⁵⁾, other rheumatic disease (ORD),⁽⁵⁾ no rheumatic disease (AARD or ORD), or no diagnosis at time of review.

Results

There were 139 positive ANA referrals with 126 occurring after E-consult implementation in August 2015. E-consults were utilized in 44% (55/126) of patients with an average response time of 1.7 days. Seventy-six percent (42/55) of E-consults were resolved after initial electronic rheumatologic recommendation and did not require an in-person visit.

The average in-person visit wait time decreased from 64 to 34 days after E-consult implementation ($p < 0.001$). Special cause variation⁽⁴⁾ was identified as a shift in the control chart from June 2016 – January 2017 (Fig. 1).

AARD was diagnosed in 11 patients; the majority of referrals resulted in no rheumatic diagnosis (86/139). E-consults ordered more labs overall, but this was not statistically significant. In-person visits ordered more imaging overall, which was statistically significant (Fig. 2).

Discussion

E-consults are an effective way to address ANA referrals quickly and improve access to rheumatology for patients requiring in-person evaluation without a significant increase in resource utilization.

Multiple contributing factors in real-world settings make it difficult to precisely assess wait times.^(3,6,7) Detecting special cause variation through a control chart suggests a temporal association between E-

consult introduction and decreased wait times. There were no other changes during this study that would contribute to decreased wait times.

In our study, E-consults utilized more lab tests, but this was not statistically significant. Given the non-specific nature of the ANA test,^(1,5) E-consults for this reason may require more specific lab data before warranting an in-person evaluation.

The reduction in wait time for in-person visits has other positive downstream effects including improving value for healthcare systems and reducing patient costs by decreasing unnecessary travel and time off work for in-person appointments. Additionally, for cases when an in-person visit is needed after E-consult, efficiencies are gained by initiating work-up through the E-consult, making in-person visits more productive.

Telemedicine has been identified as a viable option to continue providing timely care during the current COVID-19 pandemic⁽⁸⁾ and many providers have quickly adapted to using telemedicine modalities including E-consults. Not only are E-consults a way to continue care during a quarantine period, but as our results indicate, they are also a considerable way to decrease in-person rheumatology wait times.

Limitations of our study include small scope and no available follow-up data to see if resolved E-consults eventually needed an in-person visit.

E-consults are an effective way to address positive ANA referrals so appropriate patients can be seen in-person in a timely manner.

Declarations

• **Ethics approval and consent to participate –**

- This study was reviewed by the Institutional Review Board (IRB) and local Research and Development Committee and designated a quality improvement project.

• **Consent for publication –**

- n/a

• **Availability of data and materials –**

- The datasets generated during and/or analysed during the current study are not publicly available due to this work being designated as quality improvement but are available from the corresponding author on reasonable request.

• **Competing interests -**

- none

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References

1. Abeles A, Abeles M. The Clinical Utility of a Positive Antinuclear Antibody Test Result. *Am J Med* 2013;126:342-8.
2. Battafarano DF, Ditmyer M, Bolster MB, Fitzgerald JD, Deal C, Bass AR, et al. 2015 American College of Rheumatology Workforce Study: Supply and Demand Projections of Adult Rheumatology Workforce, 2015-2030. *Arthritis Care Res* 2018;70:617-626.
3. Vimalananda V, Gupte G, Seraj S, Orlander J, Berlowitz D, Fincke B, et al. Electronic consultations (e-consults) to improve access to specialty care: A systematic review and narrative synthesis. *J Telemed Telecare* 2015;21:323-330.
4. Provost L, Murray S. *The Health Care Data Guide: Learning from Data for Improvement*. San Francisco: John Wiley & Sons; 2011.

5. Solomon D, Kavanaugh A, Schur P, Reveille J, Sherrer Y, Lahita R. Evidence-Based Guidelines for the Use of Immunologic Tests: Antinuclear Antibody Testing. *Arthritis Care Res* 2002;47:434-444.
6. Rostom K, Smith C, Liddy C, Afkham A, Keely E. Improving Access to Rheumatologists: Use and Benefits of an Electronic Consultation Service. *J Rheumatol* 2018;45:137-140.
7. Scheibe M, Imboden JB, Schmajak G, Margaretten M, Graf JD, Chen AH, et al. Efficiency Gains for Rheumatology Consultation Using a Novel Electronic Referral System in a Safety-Net Health Setting. *Arthritis Care Res* 2015;67:1158-63.
8. ACR Telehealth Provider Fact. <https://www.rheumatology.org/Portals/0/Files/ACR-Telemedicine-Fact-Sheet-2020.pdf>. Accessed 30 April 2020.

Figures

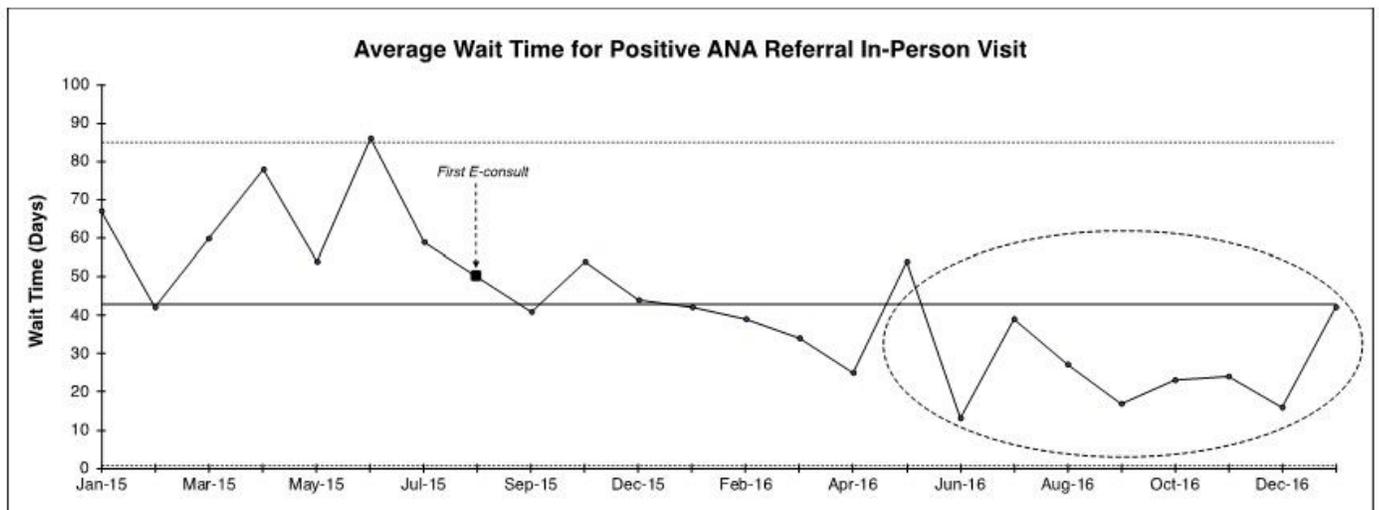


Figure 1

Statistical process control chart displaying average monthly wait time for in-person positive ANA referrals before and after the initiation of E-consults. The circle indicates special cause variation with >6 points below the central line of tendency, suggesting that the introduction of E-consults may be associated with decreased wait times.

| | In-person Visits | E-consults | p-value |
|---|-------------------------|-------------------|----------------|
| Total Number of Referrals | 84 | 55 | |
| Labs (per person) | 3.2 | 3.9 | 0.11 |
| Diagnostic Tests (per person) | 1.1 | 0.1 | 0.0003 |
| Final Diagnoses | | | |
| AARD | 8 | 3 | |
| Labs | 3.1 | 5.7 | 0.11 |
| Diagnostic Tests | 1.8 | 0 | 0.37 |
| ORD | 17 | 4 | |
| Labs | 3.5 | 1.8 | 0.23 |
| Diagnostic Tests | 1.8 | 0 | 0.15 |
| No Rheumatic Disease | 44 | 42 | |
| Labs | 3.1 | 3.9 | 0.18 |
| Diagnostic Tests | 0.6 | 0.1 | 0.01 |
| No Diagnosis (at time of review) | 15 | 6 | |

Lab and diagnostic tests are reported per person.

Figure 2

Resource utilization between E-consults and In-person visits for different diagnosis groups. Overall, more lab tests were ordered per person by E-consults, but this was not statistically significant. In-person visits ordered more imaging studies. AARD: ANA-associated rheumatic disease, ORD: Other rheumatic disease.