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RESEARCH LETTER

Initial experience with endocrinology e-consults

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Introduction

The emergence of accountable care organizations (ACOs) in the United States has created new incentives to minimize utilization and spending [1]. Unnecessary specialist visits can impair ACO performance [2], and electronic consultations ("e-consults") may provide specialist expertise in primary care settings without redundant visits. Patient and primary care satisfaction with e-consults is high, although specialist satisfaction has been mixed [3]. E-consults also may be a useful tactic to improve access to specialists [4, 5].

Reports from a variety of specialties, including rheumatology [6], cardiology [7], vascular medicine [8], and diabetes [9], have demonstrated feasibility of e-consults. The case for e-consults in general endocrinology is compelling, since many endocrine diseases are characterized by long periods of time between symptoms and diagnosis [10] and have quantitative criteria for diagnosis and treatment. Furthermore, the supply of endocrinologists in the United States is insufficient to meet demand [11]. Despite this rationale, no one has described utilization in an endocrinology e-consult program. In that context, we started an endocrinology e-consult program and conducted retrospective chart reviews and analyses of referral volumes to describe utilization.

Methods

Study population

The Massachusetts General Hospital is the largest hospital in New England, and the oldest and largest teaching hospital of Harvard Medical School. The hospital is part of several ACO contracts that involve provider risk for overall costs. If medical expenses exceed an amount predicted by a benchmark calculation, the hospital pays a penalty; if total spending is less than the benchmark, the hospital shares in the savings [1]. The hospital uses a shared electronic medical record, and a common referral request system.

Design

On 31 March 2015, we introduced a endocrine e-consult program. As described previously [7, 8], structured electronic referrals are sent by a referring provider to an endocrinologist. After reviewing the shared patient medical record, the endocrinologist provides detailed information by email to the referring provider, and creates a note in the medical record with recommendations. The referring provider then communicates with the patient and arranges any necessary testing or follow-up.

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E-consults are alternatives to traditional outpatient visits (visits), in which a patient presents to the specialist's office for an in-person evaluation. The hospital submits bills for traditional visits to payers, but since payers do not reimburse for e-consults, the hospital's physician organization pays for e-consults with internal funds.

In our endocrinology e-consult system, referring physicians choose between traditional in-person endocrinology consults and endocrinology e-consults. We recommended an e-consult if both provider and patient thought that was most appropriate without other specific restrictions on e-consults. In our hospital system, referrals to diabetes specialists are distinct from referrals to endocrinology, so diabetes e-consult referrals are not included in this analysis.

Data collection

We determined daily volumes of referral requests submitted both for endocrinology visits and for e-consults, including information on referral reason, patient age, and patient gender. When the reason for referral was not clear from the electronic system, a physician reviewed the medical record directly to determine the reason for referral. We defined the first 100 endocrine e-consult requests as a pilot phase.

We then conducted physician-adjudicated chart reviews (U.R.E.) to ascertain the days between the e-consult request and the e-consult note, to determine if an in-person visit and/or testing was recommended by the endocrinologist, to detect any adverse events, and to determine if the referring provider followed e-consult recommendations. Speed of responses and outcomes of e-consults are presented using descriptive statistics. For e-consults and visits during the pilot period, we compared patient age, gender, and reason for referral with *t*-tests and chi-squared tests, as appropriate.

Results

Trends in e-consult and visit volume

From 31 March 2015 through 23 July 2015, 100 endocrine e-consults were requested. During this same period of time, 772 endocrine visits were requested. As such, 100/872 (11.5 %) of all consult requests (e-consults plus visits) during the pilot phase were e-consults. Of the 100 endocrine e-consult requests, 7 requests were errant requests and 1 request was a repeat request. In 4/92 (4.3 %) intended e-consult requests, an in-person visit was scheduled and occurred because of triage errors. Patients with e-consult and visit requests were similar in age (57.9 years vs. 54.8 years, $p = 0.13$) and gender (77.2 % female vs. 68.2 % female, $p = 0.618$).

Table 1 Reasons for E-consult requests and visit requests

Referral reason	E-consults ($N = 92$)	Visits ($N = 772$)	*P*-value
Thyroid disease	28 (30.4 %)	130 (16.8 %)	0.001
Osteoporosis	27 (29.3 %)	272 (35.2 %)	0.260
Adrenal insufficiency	17 (18.5 %)	11 (1.4 %)	< 0.001
Hypogonadism	8 (8.7 %)	35 (4.5 %)	0.083
Polycystic ovarian syndrome	5 (5.4 %)	16 (2.1 %)	0.048
Hyperparathyroidism	4 (4.3 %)	34 (3.4 %)	0.980
Hypercalcemia	3 (3.3 %)	12 (1.6 %)	0.236
Osteopenia	–	35 (4.5 %)	0.037
Diabetes	–	29 (3.8 %)	0.059
Alopecia	–	13 (1.7 %)	0.210
Adrenal nodule	–	12 (1.6 %)	0.229
Fatigue	–	12 (1.6 %)	0.229
Pituitary adenoma	–	10 (1.3 %)	0.272
Hirsuitism	–	9 (1.2 %)	0.298
Hypoparathyroidism	–	9 (1.2 %)	0.298
Weight gain	–	8 (1.0 %)	0.327
Reason not identified	–	6 (0.8 %)	0.396

Reasons for referral accounting for fewer than 1 % of referral volume for visits ($N = 119$) are not included in this table

Reasons for requests for e-consults and requests for visits

The most common reasons for referral were thyroid disease (28/92, 30.4 %), osteoporosis (27/92, 29.3 %), and adrenal insufficiency (17/92, 18.5 %). Referrals for thyroid disease were more commonly requested as e-consults (30.4 % of e-consult requests vs. 16.8 % of visit requests, $p = 0.001$). Referrals for adrenal insufficiency were more commonly requested as e-consults (18.5 % of e-consult requests vs. 1.4 % of visit requests, $p < 0.001$). A full summary of reasons for referral for both e-consults and visits appears in Table 1.

Speed of responses and outcomes of e-consults

Of the 92 e-consults performed, 87/92 (94.6 %) were performed in 3 business days or fewer. In 23/92 e-consults (25.0 %), an in-person visit was recommended. In 16/92 e-consults (17.4 %), an in-person visit ultimately occurred within 90 days. Among the 92 e-consults performed, in 57/92 (62 %) the endocrinologist recommended further testing (bone densitometry scans, thyroid ultrasounds, laboratory testing). In 66/92 (71.7 %) cases, the referring provider and patient followed recommendations including cases with no additional recommendations. In 23/92 (25 %) cases, recommendations

were not implemented. In 3/92 (3.3 %) cases, insufficient time had elapsed to assess compliance with recommendations. In all 92 cases (100 %), there were no clinical adverse events related to the e-consult after at least 90 days of chart review.

Discussion

In this pilot study, we have demonstrated that offering e-consults in endocrinology appears to be feasible and safe. In our experience, creating an e-consult program in endocrinology led to over a tenth of total referral volume requested as e-consults. More e-consults were requested for thyroid disease, while more traditional visits were requested for osteoporosis. In this early stage, despite detailed physician chart review, we did not find evidence of adverse events. As such, these results suggest that endocrinology e-consults may be an effective care delivery mechanism, especially for patients with thyroid disease.

E-consults are emerging as a central tactic both to improve outpatient access to specialist expertise [12] and to avoid unnecessary patient visits [2, 8] that can impair ACO performance. Furthermore, especially given the increasing demand on outpatient specialist resources [13], e-consults may improve both patient satisfaction and access. In fact, e-consults are associated with substantial decreases in wait times for specialists [5, 6]. In this work, we have confirmed and extended the feasibility of e-consults to apply specifically to endocrinology care.

Our findings should be interpreted in the setting of important limitations. First, as a study conducted within a single academic medical center, the extent to which we can apply our findings to other health care settings is uncertain. Second, although we extracted detailed downstream clinical information with physician chart review, our analysis was not randomized, so resource utilization between e-consult patients and traditional visit patients cannot be directly compared. Third, as a preliminary analysis of 100 e-consult requests with 3 months of follow-up, we cannot be certain of the effects of endocrinology e-consults on patients over time. We believe that our results should be interpreted as preliminary, but should build enthusiasm for broader adoption of e-consults in endocrinology.

Conclusion

In a pilot phase, e-consults accounted for over one-tenth of referral volume. E-consults were requested more often for thyroid disease and traditional visits were requested more often for osteoporosis. In our initial experience, endocrinology e-consults were a safe and effective mechanism to deliver endocrinology outpatient care.

Compliance with ethical standards

Conflict of interest All authors report employment from the Massachusetts General Hospital and the Massachusetts General Physicians Organization.

Ethical approval Since our work was performed for administrative purposes, it was exempt from review by the institutional review board (IRB) at Partners Healthcare per the IRB's policies.

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