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Education

Efficiency, Satisfaction, and Costs for Remote Video Visits Following Radical Prostatectomy: A Randomized Controlled Trial

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Abstract

Background: Telemedicine in an ambulatory surgical population remains incompletely evaluated.
Objective: To investigate patient encounters in the outpatient setting using video visit (VV) technology compared to traditional office visits (OVs).
Design, setting, and participants: From June 2013 to March 2014, 55 prescreened men with a history of prostate cancer were prospectively randomized. VVs, with the patient at home or at work, were included in the outpatient clinic calendar of urologists.
Intervention: Remote VV versus traditional OV.
Outcome measurements and statistical analysis: An equivalence analysis was used to assess the primary outcome, visit efficiency as measured by time studies. Secondary outcomes were patient/provider satisfaction and costs.
Results and limitations: There were 28 VVs and 27 OVs. VVs were equivalent in efficiency to relative to OVs, as measured by patient–provider face time (mean 14.5 vs 14.3 min; $p = 0.96$), patient wait time (18.4 vs 13.0 min; $p = 0.20$), and total time devoted to care (17.9 vs 17.8 min; $p = 0.97$). There were no significant differences in patient perception of visit confidentiality, efficiency, education quality, or overall satisfaction. VVs incurred lower costs, including distance traveled (median 0 vs 95 miles), travel time (0 vs 95 min), missed work (0 vs 1 d), and money spent on travel ($0 vs $48; all $p < 0.0001$). There was a high level of urologist satisfaction for both VVs (88%) and OVs (90%). The major limitation was sample size.
Conclusions: VV in the ambulatory postprostatectomy setting may have a future role in health care delivery models. We found equivalent efficiency, similar satisfaction, but significantly reduced patient costs for VV compared to OV. Further prospective analyses are warranted.
Patient summary: Among men with surgically treated prostate cancer, we evaluated the utility of remote video visits compared to office visits for outpatient consultation with a urologist. Video visits were associated with equivalent efficiency, similar satisfaction, and significantly lower patient costs when compared to office visits. We conclude that video visits may have a future role in health care delivery models.
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1. Introduction

The rising costs of health care have required the development of efficient and cost-effective health care delivery models [1]. One such initiative has been the implementation of medical care at a distance, known as telemedicine. It is estimated that in the USA, 72% of adults [2] and 81% of those using internet services currently access online health information [3]. With 55% of patients owning a smart mobile device [4], the increasing use of virtual technology has facilitated remote video communication and access to online health media. Thus, several specialties have investigated the feasibility, acceptance, and efficacy of teleconsultations, including primary care [5–8], dermatology [9], and orthopedics [10,11], with studies reporting high levels of satisfaction, equivalent health outcomes, and reduced costs [12,13].

Nevertheless, the efficacy of remote video communication has not been studied in an ambulatory urologic patient population. As part of a prospective randomized trial, we investigated the utility of remote video visits (VVs) relative to traditional office visits (OVs) in a urologic patient population. The study aims included analysis of differences in timing efficiency, patient and provider satisfaction, and costs accrued to patients. To assess the experience of a standardized population with VV, the study was limited to those with a history of surgically treated prostate cancer undergoing surveillance.

2. Patients and methods

After institutional review board approval, an equivalence designed [14] randomized controlled trial was developed to assess the efficiency, satisfaction, and costs of VV compared to OV at a single tertiary health care clinic. We hypothesized that VV would be equivalent in efficiency and patient satisfaction, with a reduction in associated patient costs.

From June 2013 to March 2014, 295 males with a history of radical prostatectomy (RP) for prostate cancer (>90 d after surgery) who were undergoing surveillance at the Mayo Clinic were identified. Men with active urologic concerns requiring physical examination, non-English speakers, and men whose primary residence was outside the states of Minnesota and Wisconsin were excluded.

Eligible patients with previously scheduled appointments were identified and contacted by telephone. After screening for active urologic issues (fever, unintentional weight loss, urinary retention, hematuria, pain, incision erythema/drainage), men were invited to participate in the study. Informed consent was obtained and men were electronically randomized in a 1:1 parallel fashion. VVs were provided at no cost to the patient. Each patient had one VV or OV as the intervention in this study.

Men randomized to OV underwent a standard clinical pathway including evaluations by a resident or midlevel provider and a staff urologist. To avoid recall bias, the patient completed a 21-point questionnaire (Supplementary File 1) immediately after the appointment that was administered via a mobile tablet (REDCap version 1.3.10, Vanderbilt University, Nashville, TN, USA). Men randomized to VV underwent a remote VV (Supplementary File 2) from home or work with their urologist at their previously scheduled appointment time. A mail-in prostate-specific antigen (PSA) test was completed locally before the appointment. Patients were evaluated by a resident or midlevel provider and a staff urologist. Immediately after the encounter, men completed the 21-point questionnaire online. If a physical examination was indicated, a follow-up clinic appointment was provided.

In the absence of a currently standardized or validated survey, a study-specific questionnaire was designed with the assistance of the Mayo Clinic Health Sciences Research department; where appropriate, questions were adopted from previously published questionnaires [8,15]. Perceived utility, confidentiality, patient activation measures [15], efficiency, and satisfaction were assessed for VVs and OVs using a seven-point Likert scale (1 = strongly agree → 7 = strongly disagree). Incurred costs and health status were also evaluated. Participating staff urologists completed a 12-point questionnaire at the conclusion of each OV and VV to assess satisfaction with the encounter, and for VV to evaluate the ease of use and efficiency of the video technology.

The primary outcome was VV efficiency, defined as differences in timing (assessed via direct observation) for the total patient–urologist encounter time minus any overlap with the resident or midlevel provider, as well as waiting time in the examination room, total patient–provider consultation time (summed for the resident or midlevel provider and the staff urologist), and total time devoted to the patient's care. Secondary outcomes, assessed via the patient questionnaire, included perceived efficiency, confidentiality, utility, and satisfaction. Costs associated with the each visit included distance traveled, travel time, monetary cost, and time away from work.

The study was powered to detect equivalence in timing efficiency at a conservative threshold difference of 5 min for total patient–provider face time minus overlap. Assuming a standard deviation of 10 min, 32 patients in each arm were projected at a confidence level of 95% for detection of equivalence between the cohorts. The study was concluded once equivalence was demonstrated, as measured by the upper and lower limit threshold of <5 min. Men who did not complete the study were excluded from the analysis.

Survey agreement was summarized by the frequency and percentage who "strongly agreed", along with the average and standard deviation for the rating, and compared using Wilcoxon rank-sum tests. Differences in time parameters were assessed using two-sample *t*-tests. Linear regression analysis was used to evaluate changes in timing endpoints throughout the course of the study. A p value of <0.05 was considered statistically significant. Statistical analyses were performed using the SAS software package (SAS Institute, Cary, NC, USA).

3. Results

After screening, 295 men met the initial criteria. Figure 1 shows a flow schema for all patients identified. A total of 70 (24%) patients could not be reached by telephone. After prescreening, 155 (69%) did not meet criteria, including 70 (45%) who declined the invitation, 25 (16%) who lacked appropriate equipment, 15 (10%) who were not comfortable with the technology, 15 (8%) who elected for an OV secondary to medical reasons, and 32 (21%) who had additional appointments or reasons for travel. In total, 70 (31%) men were randomized, of whom 27 (75%) OV and 28 (82%) VV patients completed the study.

Regarding the primary endpoint, we found equivalence in visit efficiency between the cohorts. Specifically, among VV versus OV patients, there was no difference in total time devoted to patient care (mean 17.9 vs 17.8 min, 95% confidence interval [CI] −5.9 to 5.6 min; $p = 0.97$), total patient face time (14.5 vs 14.3 min, 95% CI −5.4 to 5.2 min; $p = 0.96$), patient–staff face time (12.1 vs 11.8 min; 95% CI −4.2 to 3.5 min; $p = 0.85$), or patient waiting time (18.4 vs 13.0 min, 95% CI −13.7 to 3.0 min; $p = 0.20$). Linear regression analysis of timing data throughout the course of the study revealed a downward trend in timing parameters

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