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Remote video monitoring is another example of “dying on the machine” for critically ill patients

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Remote video monitoring is another example of “dying on the machine” for critically ill patients

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ABSTRACT A critical appraisal and clinical application of Hardin SR, Dienemann J, Rudisill P, Mills KK. Inpatient fall prevention: use of in-room webcams. *J Patient Saf.* 2013 Mar;9(1):29-35. doi: [10.1097/PTS.0b013e3182753e4f](https://doi.org/10.1097/PTS.0b013e3182753e4f)

Keywords: video monitoring, patient safety, fall risks, social context

Clinical Context

A 68-year-old Caucasian male with a past medical history of a traumatic brain injury, unilateral blindness, empty sella syndrome with pan hypopituitarism, coronary artery disease, chronic kidney disease, and chronic obstructive lung disease presented from an assisted nursing facility for intravenous diuresis and treatment of a superficial wound from venous insufficiency. On the medical floor, the patient was encouraged to call for assistance to use the toilet. On admission day four, patient mechanically fell while ambulating without his walker or assistance trying to reach his bedside commode. His feet were wrapped with Kerlix™, ACE™ bandages, and he was not wearing non-slip socks. He fell forward, hitting his left knee, left elbow and biting his upper lip. There was no loss of consciousness, head trauma, chest pain, or shortness of breath. Patient was assisted back to bed, non-slip footwear was placed on both feet, a bed alarm and Avasys® video monitoring were placed for safety.

Clinical Question

Does centralized video monitoring improve patient outcomes?

Research Article

Hardin SR, Dienemann J, Rudisill P, Mills KK. Inpatient fall prevention: use of in-room webcams. *J Patient Saf.* 2013 Mar;9(1):29-35. doi: [10.1097/PTS.0b013e3182753e4f](https://doi.org/10.1097/PTS.0b013e3182753e4f)

Related Literature

A PubMed search started with “video monitoring” AND “patient safety,” filtered by clinical trials. There were twelve results, none of which was relevant. The “Titles with your search terms” section of the PubMed search page listed only three studies, all of which

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were highly relevant.¹⁻³ We used the “Similar articles” function for each of the first three citations and reviewed abstracts for an additional 21 studies returned by PubMed. One additional relevant study was identified.⁴

We tried many other searches but found only unrelated papers focused on telehealth, drug trials, endoscopic procedures and real-time video consultations. We also found a large number of nursing articles related to remote video monitoring that reported only on cost containment, without any patient oriented outcomes reported.

One study published in 2016 in the *Journal of Nursing Care Quality*¹ focused on the impact of centralized video monitoring (CVM) of high-risk fall patients in an acute care setting. Cost savings and reduction of sitter hours were analyzed but not the impact on patient morbidity. Control and intervention groups weren’t appropriately matched based on fall risk assessment or patient data.

Another 2016 study compared rate of falls and cost savings between pre and post-interventional groups receiving CVM.² This study was limited by focusing on a single facility with a high acuity rehab population. Moreover, the study used a non-standardized classification of fall risk, relying on the facility’s nurse manager and patient’s primary nurse to determine patients at high risk. Both factors severely limited the reproducibility and generalizability of the study.

A 2013 study focused on the impact of patient falls as a CMS quality indicator related to reimbursement and the impact of centralized video surveillance on falls, elopement, and staffing costs.³ Data of positive benefits lacked reliability since data was collected based on an informal feedback log from technicians monitoring video. Supposed benefits mentioned in the study were based on anecdotal evidence as part of outcomes.

The clinical trial published in the *Journal of Patient Safety* (2013) was a randomized, controlled trial of in-room webcams in 10 hospitals. Each hospital had a fall rate greater than 2.7 falls per 1000 patient days (per National Database of Nursing Quality Indicators benchmark).⁴ It measured patient orientated outcomes and fall risks in patients admitted to a medical-surgical unit (which is what our patient was admitted to). The study methodology of this paper was stronger because it was standardized in terms of intervention and control unit characteristics and fall risk assessment, and the consistency of data collection was vetted. The setting of the trial was similar to the care environment of our patient. For these reasons, we chose this article for our critical appraisal.

Critical Appraisal

The sampling frame for this study was 56 hospitals from a national health system. Hospitals were eligible to participate if they failed the National Database for Nursing Quality Indicators (NDNQI) with greater than 2.7 falls per 1000 patient days for three of the last four quarters of reported data. Seventeen hospitals met these criteria and from that group ten hospitals participated as a clustered sampling protocol. These ten hospitals were then randomized to intervention with the *CareView* system (N=5) or standard of care (N=5) on one medical-surgical bed patient floor per hospital. A stratified sample included rural, urban, and suburban hospitals in equal proportion between the two groups. The randomization was not successful as the intervention and control groups differed markedly by length of stay per admission.

The *CareView* system included a Webcam/Virtual Bed Rail system. The vendor provided the equipment and the training for nursing staff. Staffing ratios for nurses remained the same. Nurses used the Morse Risk Assessment tool to find patient participants in the selected patient care units. A score of 49 or greater met the inclusion criteria. Patients were required to be older than 18 years and able to give consent. There was a possible Hawthorne effect related to “nurse assessment.” Patient participation rates were low (median 20%). Usual nursing care was maintained with fall risk assessed every 12 hours and usual fall prevention strategies were continued, including patient and family education, lowered bed, nightlights, available call lights, frequent toileting, and non-skid footwear. It is notable that the authors don’t specify anything about the use of sitters—the obvious comparator. We consider this to be a critical flaw of the paper.

CareView approached the authors to study the effectiveness of surveillance devices by donating the equipment. They didn’t participate in data collection, analysis or publication, but were present for weekly conference calls indicating a possible funding bias influencing data collection. The vendor did perform safety monitoring and statistical analysis since these conference calls focused on ensuring consistency of data collection and troubleshooting faulty equipment. Attrition bias was minimal as approximately 1.43%

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withdrew participation. Of note, 91 changed to “yes” consent with an overall consent rate of 20.6%. The study wasn’t registered prospectively, per a search at ClinicalTrials.gov.

The fall rate per 1000 patient days (the NDNQI standard) was not different between the groups of hospitals. The authors reported data on fall rate per admission, but this is misleading because of the disparity in length of stay and number of admissions. There was a qualitative component to the study, but this analysis reported no patient oriented outcomes.

We consider this paper to be Level 3 evidence based on a critically flawed design and implementation, and the body of literature has a Strength of Recommendation of C (opinion).⁵

Clinical Application

Our patient met the study’s inclusion criteria as he was >18 years, admitted to the general floors and had intact decision making capacity.

Per CareView⁶, the webcam/virtual bed rail supplier, a 3-year subscription for 100 systems costs \$8,600.00/month. This fee includes installation, monitoring stations, staff training, onsite technical support, software upgrades and clinical planning with a trained RN. In the age of Accountable Care Organizations, the lack of benefit of this expensive technology compared to an investment in additional human staffing is an important question.

Our patient had many nursing care needs. He fell because he tripped on the bandages applied to his legs, or because of lack of assistance while trying to toilet. Our team had long discussions about replacing human contact with technology. Social dimensions of care as described by Beach and Inui remain the standard of care.⁷ This patient had too many disabilities to be aware of the remote video monitoring, but other patients near the end of life often choose human contact over mechanical intervention.

Take Home Points:

1. At this point, there is no evidence that video monitoring improves patient outcomes.
2. Future research should be aimed towards exploring the social impact of human versus remote surveillance.
3. Patient morbidity and improved outcomes must come before financial considerations when ensuring patient safety.

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