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THE IMPACT OF TELEMEDICINE ON PREOPERATIVE AND POSTOPERATIVE CARE IN SURGERY

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Abstract

Telemedicine refers to a healthcare service in which doctors interact with patients from a distance utilizing telecommunication technology. Telemedicine is utilized for pre- and after surgical assistance, surveillance, and surgical education. The objective of our study was to examine the diverse array of telemedicine tools used in the field of surgical care. A comprehensive search was conducted in MEDLINE, EMBASE, CINAHL, and Science Direct databases to identify relevant material published from the beginning of these databases. No limitations were placed on the language of the articles. The search phrases used were: mobile phones, telemedicine, internet access, video, online, teleconferencing, distant advice, surgery, preoperative, perioperative, postoperative, and surgical operations. Included studies focused on the use of telemedicine during the pre-, peri-, or post-surgery stages, and included a comparison between standard surgical care and surgical telemedicine. Patients have reported several advantages of adopting telemedicine, including the ability to prevent needless visits to hospitals, saving time, and lowering the number of lost working days. Telemedicine in surgical treatment offers advantages to both patients and professionals.

Keywords: Telemedicine, surgical process, satisfaction, monitoring

1. Introduction

Telemedicine refers to a healthcare service that has been in use since the 1970s. It allows doctors to contact with patients remotely utilizing telecommunication technology (1, 2). The origins of this advancing technology may be traced back to the early 20th century, when Willem Einthoven, a Dutch biologist, created the first electrocardiograph in his laboratory in Leiden. Einthoven captured the electrical heart signals of patients at a hospital located 1½ kilometers distant by using a string galvanometer and telephone cables. According to the Institute of Medicine (IOM), telemedicine is the use of electronic information and communication technology to provide and facilitate healthcare services when there is a physical distance between the participants (3).

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Telemedicine technologies have been used in surgical care to provide pre/postoperative surgical consultations and monitoring, as well as surgical teleconferencing and cross-border education (4-8). In 1998, Robie et al. discovered that telemedicine yielded precise diagnoses for newborn surgical consultations (9). Bullard et al. found that neurosurgeons were able to make patient decisions based on mobile-phone pictures of CT scans. This decreased the requirement to transfer patients from referring institutions by 30-50% (10). A separate research discovered that using telemedicine for postoperative follow-up after cleft lip/cleft palate surgery resulted in significant reductions in travel time and distance. Additionally, it enabled access to specialized services within a wider range than what would typically be feasible for an in-person clinical consultation (11). In addition, Urquhart et al. found that telemedicine was a secure and efficient method for doing normal postoperative follow-up following parathyroidectomy (12).

While several studies have explored the use of certain technologies in telemedicine or the utilization of telemedicine in certain surgical subspecialties, none have comprehensively analyzed the use of telemedicine in surgical care from a wide-ranging standpoint. The objective of this systematic review is to provide a comprehensive analysis of the use of telemedicine in the field of surgical care.

2. Medical result

The study conducted by Lee et al. found that telemedicine technology achieved a 100% agreement with on-site preoperative diagnostic findings (15). Hands, et al. used telemedicine to send patients to the vascular surgery clinic and discovered that the implementation of alternate treatment strategies had positive effects on both consultants and patients (16). Demartines et al. examined the precision of assessing the anatomy and function of organs prior to surgical procedures involving the digestive or endocrine systems (14). Three studies have shown that telemedicine-based preoperative diagnosis is as accurate to treatments conducted in traditional clinics (9, 17, 19). Wallace et al. used telemedicine to enable several surgical teams to assess patients' injuries prior to their admission to the operating room. The investigations revealed that the use of technology resulted in a decrease in unnecessary transfers to the neurosurgery department and a reduction in surgical complications (18, 20). Postuma and Loewen discovered that patients were able to use videoconferencing via their own desktop computers at home for cosmetic surgery consultations, hence eliminating the need for them to go to the hospital (21).

Four studies used either pictures or teleconferencing to evaluate postoperative wounds. The researchers discovered that using a mobile-phone-assisted system enhanced the process of postoperative follow-up and reduced the need for patients to physically visit ambulatory care facilities for regular wound assessments (25, 27, 28, 33, 36, 37). Another kind of intervention was the use of telemedicine for regular follow-up. Four studies used teleconferencing to examine typical postoperative treatment and observed that the technology facilitated robust connection between patients and healthcare providers (23, 31, 34, 35).

Two studies reported the use of videoconferencing using a mobile phone to remotely monitor patients using an electronic blood pressure monitoring device or to monitor surgical drains. The studies concluded that this approach was very advantageous for both the patients and the healthcare providers involved (26, 30). A research detailed the use of telemedicine to do follow-up assessments on newborns, specifically to monitor their sleep environment, measure readings on medical equipment, and promptly identify signs of infection (24). McGillicuddy et al. concluded that the use of smart phones resulted in enhanced long-term graft results and improved treatment of comorbidities as compared to routine surgical care. The research revealed a positive correlation between telemedicine and improved medication adherence, reduced systolic blood pressure, and expedited medication modification (32).

3. Patient satisfaction and cost savings

In a research conducted by Ellison et al., patients who had undergone urological operations were examined. The primary focus of the study was to assess patient satisfaction with the 'tele-visit' in comparison to standard treatment. The tele-visit arm received positive feedback from almost 95% of patients, who believed that this kind of treatment should be adopted as the future standard for patient care (29). Telemedicine satisfaction was noted in nine further trials (12, 17, 24, 25, 27, 29, 32-34). Telemedicine studies consistently indicated high levels of satisfaction, with ratings ranging from 4.5 to 5 out of 5. Two studies that discussed patient satisfaction made mention of cost savings (12, 19). The majority of patients' feedback focused on the importance of minimizing needless visits to hospitals, optimizing time management, and minimizing the number of lost workdays (24, 25).

4. Discussion

Telemedicine technology is increasingly becoming a vital instrument in the provision of healthcare (2, 3, 38-43). This systematic study specifically examined the use of telemedicine in the context of surgical treatment. We included research that compared in-person consultations with telemedicine in order to derive practical recommendations about the use of this technology. Our analysis determined that telemedicine is a valuable technique for surgical treatment, as shown by all the papers included in our evaluation. Most research focused on the use of telemedicine for patient and healthcare provider interactions, with just one study examining the comparison of telemedicine usage across two institutions.

The research included in the study showed that telemedicine was advantageous in preoperative assessment and diagnosis, post-surgery evaluation, and follow-up visits. Five studies have determined that videoconferencing is both practical and helpful for postoperative assessment and follow-up. Digital pictures were appropriate for evaluating surgical wounds. Martínez-Ramos et al. found that telemedicine facilitated the evaluation of local issues by doctors, hence preventing needless hospital trips (25). Two studies (9, 16) found that telemedicine with internet-enabled PCs was advantageous for preoperative diagnosis. Regarding

postoperative care, the use of videoconferencing and digital cameras facilitated a precise diagnosis and treatment plan.

A common constraint in the use of telemedicine technologies has been identified. The widespread use of this technology is now hindered in many hospitals due to many factors. Initially, the tangible financial benefits of telemedicine for the healthcare system are still not substantial (36). Out of the 24 research examined, one study revealed that the expense of acquiring software and digital cameras for connecting desktop computers and broadcasting live video during newborn surgical consultations ranged from 5000 to 15,000 U.S. dollars (9). Wallace et al. found no empirical support for cost reductions associated with telemedicine (20). In addition, healthcare personnel must get education and training on the use of telemedicine in order to properly implement it.

Our research demonstrates that telemedicine offers greater benefits compared to conventional surgical treatment. Thus, we recommend that healthcare providers use telemedicine technology in hospitals to assist healthcare practitioners in delivering more streamlined treatment. For more study, we suggest carrying out a randomized controlled trial or group trial since they provide more substantial evidence compared to observational studies. The majority of the papers included in our review examined both ancient and contemporary technologies. However, it is important to do more research on the future generation of technologies that will influence the practice of surgical care.

5. Summary

The findings of our research indicate that the use of telemedicine in surgical treatment might provide advantages for both patients and healthcare professionals. Telemedicine enhances patient accessibility to the healthcare system and offers substantial time efficiency for both patients and healthcare practitioners. Furthermore, telemedicine may significantly enhance patient care by facilitating the cooperation of surgical teams situated in disparate locations. It is crucial to acknowledge that more efforts are required to surmount the obstacles to the use of telemedicine technology in surgical treatment.

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