SPECIAL COMMUNICATION

Telementoring for breast surgeons practicing in remote areas

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Abstract

Telementorship allows an expert surgeon to mentor another surgeon through an advanced procedure from a remote location via 2-way audio-visual communication. The current article was planned to review the existing literature and evaluate the utility of telementorship regarding educating rural surgeons in Pakistan about multidisciplinary breast cancer care. Publications from 2016 to 2020 were searched on PubMed and GoogleScholar and 10 most recent publications were selected. Review of literature revealed that even though telementorship in this context might be comparable to onsite mentorship, multiple concerns need to be addressed before its implementation. These include lack of concrete evidence regarding its effectiveness, legal, security and financial issues. Thus, a pilot project evaluating the efficacy of telementorship needs to be conducted for rural breast surgeons working in Pakistan. If these studies show promise and an affordable, convenient and effective method of telementorship is devised, then it may become the future of breast surgery training in far-flung regions of Pakistan.

Keywords: Telementoring, Surgery training, Rural surgery, Breast cancer.

Introduction

Video telementoring is a technique that allows an experienced surgeon to guide a less proficient caregiver through new or advanced surgical procedures from a remote location facilitated by telecommunication technology.[1]

Over the last few decades, an increase in the burden of non-communicable diseases has taken place, resulting in 80% deaths in low and middle income countries (LMICs). Malignancies make up a significant number of these diseases, accounting for 19% of surgical disability adjusted life-years (DALYs).[2] High breast cancer incidence is a source of huge concern to healthcare workers in Pakistan as it affects 1 in 9 women, killing almost 40,000 women annually,[3] making it the leading cause of cancer-related mortality in the female population.[4] Despite the high burden of disease, there is a very limited infrastructure to address this problem. Punjab is the most developed province of Pakistan with a population of 110 million people. It has only 17 cancer care hospitals and 22 trained surgical oncologists that cater to cancer patients.[5]

Around 70% of Pakistan's population is still scattered in rural areas where access to healthcare is minimal because of multiple socio-economic reasons, poor healthcare infrastructure and a lack of awareness about diseases and their symptoms.[3] A severe disparity in access to specialised breast cancer care exists between urban and rural populations. To improve healthcare quality and access to breast cancer care in rural areas it becomes imperative that steps are taken to enable rural breast surgeons to perform complicated and advanced procedures comfortably in small hospital settings with resource limitations. Additionally, it is essential that they have a thorough understanding of the concept of multidisciplinary breast cancer care. Ideally, these surgeons must have access to a multidisciplinary tumour board. Thus arises the need for development of high-quality infrastructure and advancing the skill set of cancer care providers working in rural settings through strategies like surgical telementoring.

The current article was planned to explore the benefits and limitations of surgical telementorship for advanced breast surgery training, and to explore whether it is a feasible technique that can be implemented in rural areas of LMICs, like Pakistan.

Methods and Results

The literature search was conducted in September 2020 on databases, including PubMed and GoogleScholar. Publications were searched within a 5-year time frame, ranging from 2016 to 2020. Search terms included "telementorship", "surgical training", "virtual training", "breast surgery" and "rural surgery". The 10 recent, most relevant publications were selected. Literature was not available for the use of surgical telementoring for breast surgical oncology training specifically. Relevant recommendations were derived from existing literature pertaining to general surgery.

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Benefits of Telementorship

Surgical telementorship offers a suitable alternative to traditional onsite mentorship for acquiring specialised peri-operative and surgical skills. Usually, traditional on-site mentorship and training is available to a limited number of individuals in urban and/or academic centres that are inaccessible for many rural surgeons who have logistical, financial or geographical barriers. To bridge this gap, surgical telementorship may be employed for capacity-building. According to a systematic review in 2017, patient outcomes post-surgery, when supported by telementorship, were comparable to onsite mentorship. No significant difference was seen in operative time or post-operative complication rates.[6] Feedback from participating surgeons in such programmes has been positive, reporting increased confidence in performing advanced surgical procedures and increased understanding of anatomical planes and surgical steps.[7] According to a survey completed by members of the American College of Surgeons (ACS) Advisory Council for Rural Surgery in 2016, most rural surgeons felt that surgical telementoring was a useful technique for the development of new skills and for consultation of unexpected findings during a procedure.[8] One major advantage noted was the development of better professional relationships between academic and community surgeons, relieving the sense of isolation often experienced by the latter group.[7]

In LIMICs, like Pakistan, where financial resources and medical infrastructure are mostly limited to urban centres, telementorship could serve as an invaluable adjunct for those already in practice, especially in remote areas. This method of instruction could support community / rural surgeons as they acquire new skills, enabling them to deal with not only the surgical aspect of complex breast cancer cases, but also to remain abreast of the ever-evolving multidisciplinary care. Through telementoring, this capacity-building can be achieved without disrupting clinical practices or inconveniencing the patients. The presence of such a programme in itself may provide the impetus for surgeons to seek additional training. In developing countries, like Pakistan, patients often present with advanced disease. This has been attributed to a lack of screening programmes, lack of awareness about the disease, illiteracy, sociocultural and economic factors.[9] According to a single-institution study in Pakistan, 33.2% breast cancer patients presented with locally advanced stage III disease, while 18.9% of patients had distant metastasis at the time of presentation.[10] This delay in presentation lowers their 5-year survival rate to 12% compared to those who are diagnosed with early-stage disease (88%).[9] Techniques like multidisciplinary surgical telementorship can enable rural surgeons to offer contemporary breast cancer care and match the standards of care at academic urban centres. In so doing, they are better able to provide for the community they serve. Through this approach, delays in seeking care caused by geographic or financial barriers may be mitigated, leading to improvement in 5-year survival rates.

Means for telementorship

The field of medicine has benefitted from the ever-evolving digital technology that has revolutionised all aspects of modern life. Multiple technological advances are being utilised or can be implemented in the future for the purpose of smart education of surgeons. These modalities include:

1. Basic video conferencing techniques: Applications, such as Skype and FaceTime, have been in use for video calls between mentor and mentee surgeons. Advantages of using these modalities include easy availability, low cost and no requirement of specialised equipment. However, these interactions are not secure and do not follow standard patient confidentiality guidelines. The mentor-mentee interaction is limited. The mentoring surgeon has limited opportunity of direct observation of the actual surgical procedure. Despite easy availability and low cost, there is no concrete evidence supporting the efficacy of such video-conferencing techniques compared to currently available advanced and sophisticated technology.[11]

2. Wearable technology: Google Glass is a wearable computer in the form of eyeglasses. It has audio-visual capacity, wireless connection and an integrated display screen. The advantage of using this technology lies in the fact that it provides hands-free visualisation of the surgical field. However, according to a survey answered by surgical attendings/consultants at Massachusetts General Hospital, the video quality of Google Glass was inadequate for surgical telementorship compared to the video quality of Apple iPhone 5. Thus, this technology may be useful for telementorship if enhancements are made to improve the experience for participating surgeons.[12]

3. Robotic Telementoring Platforms: Robotic telementoring platforms, like VisitOR1 (Karl Storz Endoscopy-America Inc.) provide an efficient means for the remote surgeon to achieve more control in the operating room. This technology offers the mentor surgeon both internal endoscopic and external operation theatre views of the surgical site. It provides the mentor

surgeon control of the external camera as well as laser-pointing abilities[11] and telestration, which is the ability to draw on a live video image.[12] It also conforms to patient confidentiality guidelines. It is a good technological source for telementoring, but the high cost make it inaccessible for surgeons operating in low-resource settings.

4. Augmented Reality: Augmented reality is defined as the integration of digital information with the user's environment in real time.[11] The System for Telementoring and Augmented Reality (STAR) is a platform that uses augmented reality for teaching surgical skills. Participants using STAR make fewer errors compared to participants not using it, although the former group has slightly increased task completion time. Existing literature on uses and efficacy of augmented reality for surgical telementoring is insufficient, but promising.[11,13]

Limitations of telementorship

Surgical telementorship is being recognised as a suitable teaching method, but it is still far from being practically implemented around the globe. There are several limitations for the implementation of this educational model. First and foremost is the fact that the effectiveness of surgical telementorship as an educational technique remains uncertain, especially in LMIC settings. Supporting evidence is available, but it must be interpreted with caution due to small sample size. Other limitations include legal and licensing issues, technology limitations and logistical issues. For this educational technique to be successful, the mentor-mentee relationship will have to evolve to one of mutual respect and an open discussion of the logistical realities. Mentors will need to acquire teaching skills suitable for facilitating complex surgical skills virtually. Questions arise about where the liability lies; with the mentor or the mentee, and about the remuneration for mentors.[14]

In LMICs, it may be challenging to use these training modalities for rural surgeons because of financial and legal issues. Rural hospitals may face financial and logistical challenges in terms of the setup costs and accessing secure, reliable and fast network connections.

Pakistani rural surgeons and multidisciplinary breast cancer care

In 2019, the College of Physicians and Surgeons Pakistan (CPSP) introduced a 2nd Fellow of the College of Physicians and Surgeons (FCPS) programme in breast surgery. Due to the recent introduction of this specialised fellowship programme, a few centres are staffed with specialty-trained breast surgical oncologists. Most care is delivered by general surgeons who may not have had the means or the interest of following the latest advances in breast care. This leads to suboptimal breast cancer treatment for a vast majority of rural patients. In this era of evidence-based medicine, treatment momentum has shifted in favour of a multidisciplinary approach, which has been shown to influence both clinical decision-making and treatment regimens being offered to the patients.[15] Due to the above-mentioned barriers, rural surgeons in Pakistan are unlikely to match the prescribed standards. In order to overcome these, rural surgeons will need to be made aware of the changing landscape of breast care. Subsequently, virtual surgical training may be offered as a tool to bridge the gap. The rural surgeons may log into virtual tumor boards, multidisciplinary board meetings, journal clubs, and seminars being conducted at academic centers to bring themselves up to speed with the standard of care to treat breast cancer patients.

Future of telementorship in breast surgical oncology

Telementorship may play a significant role in the education of breast surgeons practising in remote areas. However, the first step is to create an understanding of self-assessment and recognition of limitations on the part of rural centres, rural surgeons and the mentors. Legal, licensing, finance and security are a few of the major aspects that need to be addressed.

Over the years, many studies have been conducted to determine the effectiveness of telementorship in surgical specialties like neurosurgery, paediatric surgery and ear-nose-throat (ENT) surgery, with majority of these studies focussing on general surgery and urology. The majority were case series or poor-quality case-control or cohort studies.[16]

To the best of authors' knowledge, no study has been conducted to specifically test the effectiveness of this technique in breast surgery training.

Thus, before this teaching technique can be widely implemented, we need to gather concrete evidence regarding its effectiveness in teaching and subsequent improvement in breast cancer patient outcomes which can only be done through quality randomised controlled trials (RCTs) with large study samples.[17]

Pakistan may be able to initiate a pilot study to determine the efficacy of telementorship as an educational tool. This may be done through a pre-and-post test to assess not only the surgical outcomes, but, very importantly, the surgeons' treatment approach to breast cancer patients. This may be possible through collaboration between private and public

healthcare entities with the local government, international funding agencies for financial and logistical support to further the cause of global surgery.

Furthermore, partnership with academic hospitals around the globe for their intellectual support may help in providing the essential expertise. If the initial data is positive, telementorship may be the way forward to bridge the gap in the education and skill-set of urban and rural breast surgeons.

Conclusion

Surgical telementorship has proven to be a promising new development in surgical training, but it is associated with a plethora of legal, technological, financial and security issues that need to be completely resolved before the world moves towards implementation of this idea on a large scale. For LMICs, surgical telementorship will remain an idea unless a practical and cost-effective method of implementation is devised.

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References

1. St Julien J, Perrier ND. Video Telementoring to Accelerate Learning of New Surgical Techniques. JAMA Surg 2016;151:671-2. doi: 10.1001/jamasurg.2016.0054.
2. Ologunde R, Maruthappu M, Shanmugarajah K, Shalhoub J. Surgical care in low and middle-income countries: burden and barriers. Int J Surg 2014;12:858-63. doi: 10.1016/j.ijsu.2014.07.009.
3. Talib Z, Amersi F, Harit A, Saleh M. Promoting breast cancer awareness and clinical breast examination in the LMIC: experiences from Tajikistan, Pakistan and Kenya. Curr Breast Cancer Rep 2019;11:152-7. Doi: 10.1007/s12609-019-00321-7
4. Pakistan Source: Globocan 2018 [Online] 2019 [Cited 27 August 2020]. Available from URL: https://gco.iarc.fr/today/data/factsheets/populations/586-pakistan-fact-sheets.pdf
5. Khokhar MA, Ali MM, Liaqat S, Moin A, Sarwar HA, Sarwar MZ. A review of access to cancerfacilities in Punjab, Pakistan. Cancer Reports 2020;3:e1245. Doi: 10.1002/cnr2.1245
6. Bilgic E, Turkdogan S, Watanabe Y, Madani A, Landry T, Lavigne D, et al. Effectiveness of Telementoring in Surgery Compared With On-site Mentoring: A Systematic Review. Surg Innov 2017;24:379-85. doi: 10.1177/1553350617708725.
7. Huang EY, Knight S, Guetter CR, Davis CH, Moller M, Slama E, et al. Telemedicine and telementoring in the surgical specialties: A narrative review. Am J Surg 2019;218:760-66. doi: 10.1016/j.amjsurg.2019.07.018.
8. Glenn IC, Bruns NE, Hayek D, Hughes T, Ponsky TA. Rural surgeons would embrace surgical telementoring for help with difficult cases and acquisition of new skills. Surg Endosc 2017;31:1264-68. doi: 10.1007/s00464-016-5104-6.
9. Gulzar F, Akhtar MS, Sadiq R, Bashir S, Jamil S, Baig SM. Identifying the reasons for delayed presentation of Pakistani breast cancer patients at a tertiary care hospital. Cancer Manag Res 2019;11:1087-96. doi: 10.2147/CMAR.S180388.
10. Ali B, Mubarik F, Zahid N, Sattar AK. Clinicopathologic Features Predictive of Distant Metastasis in Patients Diagnosed With Invasive Breast Cancer. JCO Glob Oncol 2020;6:1346-51. doi: 10.1200/GO.20.00257.
11. El-Sabawi B, Magee W. The evolution of surgical telementoring: current applications and future directions. Ann Transl Med 2016;4:391. doi: 10.21037/atm.2016.10.04.
12. Hashimoto DA, Phitayakorn R, Fernandez-del Castillo C, Meireles O. A blinded assessment of video quality in wearable technology for telementoring in open surgery: the Google Glass experience. Surg Endosc 2016;30:372-8. doi: 10.1007/s00464-015-4178-x.
13. Andersen D, Popescu V, Cabrera ME, Shanghavi A, Gomez G, Marley S, et al, Medical telementoring using an augmented reality transparent display. Surgery 2016;159:1646-53. doi: 10.1016/j.surg.2015.12.016.
14. Schlachta CM, Nguyen NT, Ponsky T, Dunkin B. Project 6 Summit: SAGES telementoring initiative. Surg Endosc 2016;30:3665-72. doi: 10.1007/s00464-016-4988-5.
15. Soomro R. Breast Surgery Fellowship: Need of Contemporary Times. J Coll Physicians Surg Pak 2019;29:1023-24. doi: 10.29271/jcpsp.2019.11.1023.
16. Erridge S, Yeung DKT, Patel HRH, Purkayastha S. Telementoring of Surgeons: A Systematic Review. Surg Innov 2019;26:95-111. doi: 10.1177/1553350618813250.
17. Augestad KM, Han H, Paige J, Ponsky T, Schlachta CM, Dunkin B, et al. Educational implications for surgical telementoring: a current review with recommendations for future practice, policy, and research. Surg Endosc 2017;31:3836-46. doi: 10.1007/s00464-017-5690-y.