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Commentary

Recent advances in pediatric telemedicine

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Abstract

Telemedicine is a medical service, which is offered across a spatial distance. Doctors and patients use digital tools such as apps, teleconsultation platforms or video technology. There is currently no uniform and generally applicable definition of telemedicine. In the broadest sense it is understood to mean the overcoming of temporal and spatial distances in the context of medical issues. This mainly includes the measurement, recording and transmission of information or the application of medical procedures with the help of information and communication technology between physicians, or between physicians and patients, possibly with the involvement of non-medical personnel. Pediatric telemedicine was performed yet in different pediatric subspecialties. The focus of this manuscript is based on pediatric telemedicine performed in general by two persons, the virtual acting doctor and an experienced telemedical assistant in the pediatric emergency department. The telemedical examination technique will be presented in children and discussed with special relation to current knowledge in medical literature.

Introduction

A video conference enables real-time exchange between two or more participants at different locations via audio and video communication. In terms of the visualization of the discussion partners, a videoconference thus differs from a classic telephone conference and expands it to include the visual component. The term video conferencing system refers to the technological setup or infrastructure behind such a video conference, the video conferencing technology. This refers to the hardware and software components that are required to carry out a video conference technically. In addition to comprehensive room systems, there are now also more cost-effective alternatives such as desktop systems or solutions from the cloud. Focus primarily lies on fully integrated room systems that transform a conventional meeting room into a virtual video conference room. Anyone who uses video conferencing needs a high degree of discipline. The conferences have to be better prepared mentally, they run more moderated, concentrated, and focused. The good news is that all these conference quirks no longer come into play in Corona-conditioned video and telephone conferences. There simply isn't time for them anymore. Pediatric practitioners who use video conference need the highest level of discipline. The conferences have to be better prepared mentally, they run in a more moderated, concentrated, and focused manner. As a result, many employees who were previously rather critical of conferences are now getting to know a completely new form of meeting: faster, more productive, more efficient. The decisions that are made are not necessarily worse than those that were made in the conference room just a few weeks ago. Added to this are the advantages that no one had to drive to the office for this and thus also saved the time that the commute would have taken. Video conferences in pediatrics play a more important role since Corona pandemic. To date, we use video conferences to see, diagnose, and treat the child in an ambulatory setting. It is necessary, that the pediatrician is well educated and has much experience in children medical care. Due to this routine, the pediatrician can evaluate the condition, fever, a rash, and other features of the child and can make recommendations to the parents in a calm manner, without any hurry. The only difficult examination is the heart auscultation. In these cases, the telemedical assistant can perform an ECG and present it to the doctor for telemedicine. Highest quality and sensitivity are necessary in video conference in a child, you need a nurse, the telemedical assistant, who has much clinical experience, especially

in pediatric emergency departments. Video conferences are a new tool to diagnose and treat children in an ambulatory pediatric day center to allow the pediatrician to work more flexibly, especially in staff shortage situations and high patient volume. In big pediatric ambulatory emergency settings with high patient volume, pediatric telemedicine could become the gold standard especially in pandemic situations like COVID-19 pandemic.

Pediatric Examination Technique Recommendations by Virtual Telemedicine

Pre-telemedical anamnesis

Age of the Child? (1st question). First appearance of the child, laughing or angry, looking ill or well? looking pale? Frequency of Breathing? Jugular retention? Answers questions? Coughing? Fever? Failure to thrive?

Pediatric examination from head to feet

Starting examine the head, the eyes (conjunctivitis, pus in the eyelid?), telemedical assistant press trigeminus points, assistant check cervical lymph node status, check nervus facialis, hypoglossus and eye motion by light, palpation of the thyroid by the telemedical assistant in swallowing process.

1. Check respiratory system: jugulum (obstructive episode?), inspiratory or expiratory stridor? (pseudocroup?/asthmatic signs?), paradox breathing?

2. Check abdomen: 4 quadrants from assistant, starting left lower quadrant, then left upper, epigastrium, right upper and at last right lower quadrant; umbilical or inguinal hernia? Scrotal sac filled both sides? Hydroceles? Transillumination by the telemedical assistant to describe fluid in the scrotal sacs implicating hydroceles; inspection of hydatid (blue dot sign?); inguinal hernia imposes by tumor in left/right inguinal area; when redding then possibly incarcerated and urgently send to the emergency department.

3. Examination of walking, Genua valga or Genua vara? Pelvic tilt? Inner or outer rotation of the legs?

4. Compliance of parents with telemedicine and medication? Patients have to sign a uniform consent to examine and treat the child by virtual telemedicine.

5. Writing prescription with diagnosis and treatment. Telemedical assistant writes the prescription after virtual correspondence with the doctor. Prescriptions have to be signed before assistant adds the medication.

Discussion

Telemedicine is a sub-area of telematics in healthcare and refers to diagnostics and therapy bridging a spatial or temporal distance between doctor, therapist, pharmacist, and patient or between two doctors consulting each other by means of telecommunications [1-14]. The introduction of video consultation also changes the work organization of the pediatric clinical teams in the clinical practice. In addition to setting up suitable workstations with the appropriate technical equipment and in a quiet environment, there is also the question of interdisciplinary support and the general possibility of being able to provide part of the consultation time in the home office if desired. For the families of sick children, the supplementary video consultation to personal contact offers the possibility of more frequent contacts with time savings due to the lack of travel and going through bureaucratic processes in the clinic or practice [1-4,14]. For teams working in telemedicine, the task now is to jointly develop concepts for integrating these new technologies, the necessary software solutions and communication media into their existing, individual care concept. An open attitude on the part of the players in medical care will prove positive, as the market for telemedical care services is developing rapidly. The market for digital health applications will also expand the range of care services. The adoption of the revised Section 7 of the (Model) Professional Code of Conduct for Physicians (MBO-Ä) in Germany by the Physicians' Congress in May 2018 largely solved the hurdles for telemedicine care by lifting the ban on remote treatment. Exclusive consultation or treatment via communication media is permitted in individual cases if this is justifiable from a medical point of view and the required medical care is observed, in particular by the way in which the findings are ascertained, consultation, treatment and documentation are carried out, and the patient is also informed about the special features of exclusive consultation and treatment via communication media. According to § 7 paragraph 4, sentence 3 MBO-Ä. At the same time, the National Association of Statutory Health Insurance Physicians has formulated certain requirements for the telemedically supported care of patients: The patient to be treated must give consent for the video consultation. The video consultation must take place in premises that provide privacy [1-11]. In addition, the technology used must allow appropriate communication [3,15]. The video consultation must be confidential and free of disruptions in the manner of the normal consultation. The patient's real name must be recognizable to the person treating him. The video consultation must be free of advertising. A certified video service that guarantees encrypted end-to-end transmission must be used. The technical requirements for the practice and the video service provider terms of technical security and data protection have been regulated in Annex 31b to the "Bundesmantelvertrag - Ärzte in Deutschland". Physicians or psychotherapists can only be reimbursed for services if they have previously notified their Association of Statutory Health Insurance Physicians that they will be using a certified video service provider. It should be noted that effective March 20, 2021, a revision to the attachment will go into effect, this largely affects the IT security and privacy requirements of the provider's certification. Already certified providers could continue to be used and must meet the new requirements within a transition period. In conclusion, pediatric telemedicine is the future gold standard in different pediatric specialties [8-14]. To date, pediatric telemedicine was used in emergency departments [1-3,11,12], in pediatric cardiology [16,17], in pediatric pulmonary aspects [18,19], in pediatric surgical departments [20-23], in pediatric neurology [24-26], in ophthalmologic problems like retinal disease [27]. Moreover, telemedicine was performed in pediatric rheumatology [28,29], in pediatric orthopedics [15], in ENT departments [30,31], in pediatric wound care [32] and nevertheless in COVID-19 pandemic situations [33,34].

Pediatric telemedicine is an effective and innovative new examination and treatment option, which needs two experienced practitioners, the virtual doctor with high clinical experience and a telemedical assistant with high routine in pediatric emergency settings and good communication skills in finishing communicating with the parents and prescribing the right medication or sending the child to a special department, finally finish the pediatric telemedicine event in a satisfactory manner for the child and the parents.

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