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TELE-ULTRASOUND: WHICH METHOD IN GERIATRIC CARE?

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AIM. We are interested in telemedicine applications in geriatric care settings, especially for non-invasive diagnostic techniques, to improve time and accuracy of diagnosis, therapy and follow up. Tele-ultrasound (TUS) could represent a useful telemedicine application, in all health care setting, geriatric care too. Therefore, we have carried out a review of literature, to understand the possible modalities of TUS application in geriatric care settings.

MATERIALS AND METHODS. PubMed search of studies published in the last decade (from 2013 to August 2023) with keywords “teleultrasound or teleultrasonography and elderly”.

RESULTS. 71 publications report TUS application methods of potential interest in geriatric care. The TUS includes the applications of ultrasound with allocation of patient and expert medical reporter (MR) in different locations, through a telematic interface: the location where ultrasound examination is performed on the patient (Point of Ultrasound Examination: PEX) is different from location of analysis and medical reporting (Point of Ultrasound Reporting: PUR). Resources for TUS must include: A) at PEX: a) network interfaceable ultrasound device, b) operator to perform and transmit the exam, c) hardware and software for digital transmission; B) at the PUR: a) hardware and software for receiving the examination, b) an expert medical doctor for reporting the examination; C) Telematic connection system between PEX and PUR. Three main modalities of TUS emerge from the literature: 1) Asynchronous one-way mode (AOM): execution, image collection and possible first reporting in PEX; transmission of documentation to PUR for first or second instance reporting (second opinion). This modality is not in real time and does not allow the MR to properly evaluate the exam performance in PEX. 2) Synchronous one-way mode (SOM): execution and image collection with real-time transmission from PEX to PUR, but without active interaction from PUR to PEX; compared to the AOM, the SOM can improve the assessment of the exam performance by the MR who, however, cannot guide the exam by modifying its performance in real time. 3) Synchronous two-way mode (STM): interactive procedure in real time between PEX and PUR; examination performance in PEX is dynamically viewed in PUR by the MR, which remotely guides the procedure (scans, probe movements, equipment adjustment, structures to be viewed, patient management, etc). This model assumes a real-time remote transmission structure, based on three contextually operative channels: 1) two-way audio; 2) PEX->PUR unidirectional video for transmission of ultrasound images in real time; 3) video for PEX->PUR unidirectional transmission from PEX environmental camera. MR can guide the execution of the exam from the PUR according to three procedures: 1) Robotic (STM-r), 2) Human, by healthcare professional (STM-p); 3) Human, by lay operator (STM-l). STM-r uses robotic ultrasound instrumentation, positioned on the patient in PEX and remotely operated by MR in PUR. STM-p uses ultrasound instrumentation that can be interfaced with a telematic network and an operator who performs the examination in PEX under the guidance of the MR from PUR; the operator is a healthcare professional

(doctor, nurse or technician), trained for the procedure. STM-l differs from STM-p in the lay (non-professional) nature of the examiner; feasible, albeit with obvious limitations, in particular contexts (remote or difficult areas, however poor in health resources). Several companies have already developed hardware and software systems for the methods described, using 4G or 5G telematic networks.

CONCLUSIONS. TUS is potentially useful in geriatric care as remote diagnosis technique, for which we present some considerations. 1) Unlike other fields of telemedicine, TUS is a complex procedure that can be implemented according to different methods, each of which requires a validation process, especially for diagnostic accuracy. 2) Of the three modalities described, we deem STM preferable because it is interactive in real time, guided by an expert MR and adaptable to patient compliance. 3) Like the US, the TUS is an act of medical competence. 4) These aspects must be formally defined: a) professional qualification and skills for the roles of executor in PEX and MR in PUR; b) minimum standards of resources and procedures; c) training contents and objectives for executor and MR; d) specific legal profiles (professional liability, patient consent, privacy protection). 5) Guidelines or, at least, consensus documents among experts from relevant scientific societies are needed.

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FOCUSED ASSESSMENT WITH SONOGRAPHY IN THE ELDERLY (F.A.S.E.): A PROTOCOL FOR HOSPITALIZED ELDERLY PATIENTS

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INTRODUCTION AND AIM. Compared to young adults, the elderly have greater frequency of diseases, often multiple and with more complications, organ failure, disability and mortality. The clinical presentation is often atypical or poorly symptomatic, resulting in diagnostic delays. Furthermore, the compliance of elderly, especially frail ones, is often limited by mental, anatomical and/or functional deficits, which make medical history and physical examination (PE) difficult. For these reasons we have a high interest in non-invasive and low-risk methods that can integrate the PE (substituting in difficult cases), to improve the time and accuracy of diagnosis and therapy. Ultrasound (US) is one of these methods, which can now be performed with inexpensive and easily transportable equipment, in any geriatric care setting. We consider it useful to