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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

propose a protocol for standardized US supplementing the PE in elderly patients, in order to broaden the information on their anatomical and functional status.

MATERIALS AND METHODS. We have defined Focused Assessment with Sonography in Elderly (FASE) as protocol consisting in the execution of bedside ultrasound examination upon admission to the hospital ward, oriented towards specific detections by physician with ultrasound skills, if possible immediately after the PE, in any case by the following midday.The detections are obtained according to a checklist including methodological standards: anatomical targets with related ultrasound scans and alterations to be detected (effusion, expansion, stones, etc.). Practically, FASE consists of a standardized procedure according to a check-list which provides mostly binary answers (yes/no, present/absent, not assessable) to specific questions (Q) for predefined target organs, through determined scans for each of they, as described below. - CHEST: right and left lung bases; 4 oblique intercostal scans, transverse subxiphoid scans; Q: consolidations, pleural effusion, multiple B-lines, pericardial effusion.- PERITONEUM: spaces between diaphragm-liver-kidney, diaphragm-spleen-kidney, bladder-rectum; Q: fluid effusion.- LIVER: oblique ascending subcostal scan, longitudinal scan; Q: longitudinal diameter, irregular profile, focal lesions, portal thrombus, biliary duct dilatation, hepatic vein dilatation.- GALLBLADDER: oblique ascending subcostal scan, longitudinal scan; Q: transverse diameter, stones, echogenic bile, wall thickening or lesions.- SPLEEN: intercostal scan IX-X space; Q: longitudinal diameter, focal lesions.- ABDOMINAL AORTA: longitudinal and transverse sub-umbilical scan; Q: diameter, patency, irregular walls, stenosis. - INFERIOR VENA CAVA: transverse and longitudinal sub-diaphragmatic scan; Q: patent, Ø>2cm, Ø<1.5cm.- RIGHT KIDNEY: longitudinal and transverse subcostal scans between anterior and posterior axillary lines; Q: Ø longitudinal, parenchymal thickness, dilatation of excretory tracts, stones, masses.- LEFT KIDNEY: idem.- BLADDER: suprapubic transverse and longitudinal scans; Q: volume, wall thickness, wall irregularities, masses, stones.- PELVIS: longitudinal and transverse suprapubic scan; Q: masses, effusion, prostate enlargement, endometrial thickening.- INTESTINAL LOOP: scans running along midline, midclavicular and anterior axillary lines; Q: dilatation, wall thickening.- VEINS: right and left transverse subinguinal scans with compression (CUS); Q: femoral trunk thrombosis. We performed a retrospective observational analysis of 47 consecutive elderly patients undergoing FASE (mean age 84 years; range 70-93; F28-M19), hospitalized for acute problems.We evaluated how many and which findings the FASE added to the patient's PE and, therefore, in how many cases it induced changes to the initial diagnostic and/or therapeutic trend.

RESULTS AND CONCLUSIONS. In all patients, FASE added detections to the PE, which in 35 cases (74%) induced at least partial changes in the initial diagnostic and/or therapeutic trend.The most frequent ultrasound detections, mostly multiple in individual patients, were: pleural effusion (n=22), pulmonary consolidation (n=8), dilatation (n=11) or depletion (n=6) of vein cava, renal hypotrophy (n=18), biliary stones and/or dilatation (n=13), renal cysts n=37. The quality of the procedure appeared limited for the pelvis, due to bladder depletion (in most cases due to catheter placed in ED).Our experience shows that, in the majority of elderly people hospitalized for acute events, the FASE detects additional alterations compared to the PE, such as to modify the initial diagnostic and therapeutic trend. However, a prospective study on a large series of cases is appropriate to confirm our results and clarify the effect of the FASE protocol on more specific aspects such as: length of hospital stay, complications, disability, mortality, costs.

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EXAMINING THE ASSOCIATION BETWEEN DYSGLYCEMIA AND COGNITIVE PERFORMANCES IN OLDER PERSONS

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INTRODUCTION. Type 2 diabetes mellitus (T2D) has been associated with cognitive impairment and an increased vulnerability to dementia. However, the relationship between prediabetes (also known as dysglycemia) and cognitive impairment, particularly in the older population, remains uncertain. This article aims to investigate the impact of impaired fasting glucose and T2D on cognitive abilities in a population affected by strokes.

OBJECTIVES. The objective of this study is to examine the influence of impaired fasting glucose and T2D on cognitive abilities in a population affected by strokes.

METHODS. Cognitive function was assessed in 682 subjects without a dementia diagnosis. The evaluation included the Mini Mental State Examination (MMSE) as a measure of global cognition, the Addenbrooke's Cognitive Examination Revised (ACER) rating scale, and a comprehensive neuropsychological evaluation from the GeriCo 3.0 project.

RESULTS. The study comprised 682 subjects (445F/237M) with a mean age of 76±9 years and an average education duration of 9.9±5.0 years. Among the participants, 193 (28.3%) had dysglycemia based on serum glycemic values. No significant differences were found in MMSE and ACER scores, adjusted for age and education, between the dysglycemia group and the normoglycemic subjects (26.42±0.22 *vs* 26.61±0.13 and 76.17±0.79 *vs* 76.21±0.50, respectively). However, a detailed analysis of neuropsychological functions revealed a significant difference in the Babcock story recall test, adjusted for age and education, with prediabetic subjects achieving lower scores (3.81±3.66 *vs* 6.29±4.75, p=0.006).

CONCLUSIONS. In a population of older individuals, dysglycemia is associated with poorer cognitive performance in the domain of memory.

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A MULTICOMPONENT PHYSICAL AND COGNITIVE INTERVENTION IMPROVES RESILIENCE IN OLDER PEOPLE: THE DANZARTE EMOTIONAL WELL-BEING TECHNOLOGY PROJECT

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INTRODUCTION. A key element of successful aging is resilience, defined as the ability to cope with adverse situations and to adapt to changes. However, interventions that might increase resilience in older people are yet to be clearly identified. AIM. The purpose of this study was to determine whether older