REVIEW ARTICLE

Efficiency and applicability of comprehensive geriatric assessment in the Emergency Department: a systematic review

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ABSTRACT. ***Background and aims:*** *Comprehensive geriatric assessment (CGA) may benefit frail or chronically ill patients in the emergency department (ED), but take too much time to be performed routinely in ED. An alternative approach is to use first a screening tool to detect high-risk patients and then perform CGA in these patients only. This systematic review focuses on the use and value of CGA in ED for evaluation of older patients and its influence on adverse outcomes. This approach is compared with an alternative one using existing screening tools, validated in ED, to detect high-risk patients needing subsequent CGA. This review ends by suggesting a short assessment of CGA to be used in ED and ways to improve home discharge management from ED.* ***Methods:*** *A systematic English Medline literature search was conducted in December 2009, with no date limit with the following Medical Subject Heading (MeSH) terms: "Frail Elderly", "Health Services for Aged", "Community Health Nursing", "Emergency Service, Hospital", "Geriatric Assessment", "Patient Discharge", "Risk Assessment" and "Triage".* ***Results:*** *We selected 8 studies on CGA efficiency and 14 on screening tools. CGA in ED is efficient for decreasing functional decline, ED readmission and possibly nursing home admission in high-risk patients. As CGA takes too much time to be performed routinely in ED, validated screening tools can be applied to detect high-risk patients who will benefit most from CGA.* ***Conclusions:*** *The selected studies demonstrated that screening of high-risk patients is more efficient than age-based screening, and that CGA performed in ED, followed by appropriate interventions, improves outcomes. (Aging Clin Exp Res 2011; 23: 244-254)*

INTRODUCTION

Emergency department (ED) admissions of older patients are increasing and account for 15% of all consultations (1). Annually in Italy, the average percentage of ED visits for persons aged 75 and older is 58 visits/100 persons-year, compared with 38 visits/100 persons-year for people under 65 years (2). In addition, older patients spend more time in ED, frequently have more severe diseases than younger patients, and often suffer from polymorbidity. However, geriatric syndromes like functional decline or delirium are frequently underrecognized (3). In a French transversal study including 1298 patients over the age of 80, a quarter (24.2%) directly returned home after an ED admission (4). However, this population is at high risk of adverse outcomes like ED readmission, hospitalization, functional decline, nursing home admission and death (5).

Comprehensive geriatric assessment (CGA) is a multidisciplinary tool with cognitive and mood evaluation, examination of comorbidities and polypharmacy, assessment of risk of falls and functional status (basic activities of daily living [BADL] and instrumental activities of daily living [IADL]), as well as nutritional status and social support (6). It has been shown that ambulatory CGA and subsequent specific interventions improve function, diminish hospitalization and institutionalization rate, and may prolong survival (7).

In ED, CGA is useful for identifying unknown geriatric syndromes or problems, in order to help ED physicians manage such patients (8). It identifies two new geriatric problems per patient, which had not been noted routinely by the ED physician (3). However, CGA is a time-consuming process, which may be problematic in ED. There-

Key words: Comprehensive geriatric assessment, Emergency department, geriatric outcomes, high-risk patients, screening tools.

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fore, simplified screening tools have been developed in order to detect patients at risk of adverse outcomes (9). These tools allow patients to be classified as low-risk, i.e. ones who do not need any special evaluation, and high-risk, i.e. ones who will benefit by CGA and subsequent interventions (10).

This systematic review focuses on the use and value of CGA in ED for evaluations of older patients and its influence on adverse outcomes. This approach is compared with an alternative one using existing screening tools, validated in ED, to detect high-risk patients needing subsequent CGA. This review ends by suggesting a short assessment of CGA to be used in ED and ways to improve home discharge management from ED.

BACKGROUND

Adverse geriatric outcomes

After an ED visit, older people are at risk of hospital readmission, functional decline, institutionalization and death. Mion et al. showed that readmission to ED of elders over 65 years was 15% and 40% at 30 days and 4 months respectively (11). A quarter of these ED-readmitted patients had been hospitalized (12). Four months after an ED visit, one third had functional decline, defined as reduced ability to perform tasks of everyday living because of a decrease in physical and/or cognitive functioning (13), and 4% of those over 65 had been institutionalized at 4 months (11). In a large Canadian cohort of subjects aged over 65 (12), the rate of death at 30 days after an ED visit was 1%, but reached 13% at 90 days among patients over 75 (14).

Components of CGA

CGA aims at assessing the most important geriatric concerns such as delirium, cognitive impairment, depression, BADL and IADL dependence, risk of falls, malnutrition and polypharmacy. These components and their epidemiology are listed in Table 1.

Delirium is frequent on admission and is associated with long-term cognitive decline (15). Subjects in whom delirium is not detected by ED physicians or nurses have the highest mortality (30%) over 6 months (16). Similarly, dementia has a high prevalence in ED (17), and its presence may affect compliance with medication and discharge instructions, increasing the risk of morbidity and mortality after ED discharge. Older subjects with depression consume more medical resources and have higher ED readmission rates (18, 19). It has also been shown that untreated depression may lead to functional decline (20).

Functional status is consistently found to be correlated with length of stay (21), and is closely related to adverse outcomes (22). Falls are a major geriatric problem and may result in serious injury. In community-dwelling patients over 70, the prevalence of falls at 9 months was 33% (23). Two percent of fallers were reported to suffer from hip fracture and 4% from forearm fracture. After an ED visit, older patients who fell are more at risk of further falls (24) and functional decline (25). The prevalence of malnutrition may affect 15% of community-dwelling elders, 62% of hospitalized patients, and up to 85% of nursing home residents (26). Malnourished patients over 65 have double the risk of ED admission (27).

Polypharmacy is a major problem among older people. The definition of polypharmacy varies in the literature, ranging from ≥2 concomitant drugs to ≥5 (28). Using this last definition, Jorgensen et al. reported a prevalence of 39% among people over 65 (29). The elderly have poor knowledge of their medication doses. Indeed, Chung et al. (30) showed that 57% of patients over 65 were unable to identify all their prescription medications correctly, and the likelihood of missing the name of at least one medication increased with the total number of drugs. Age-related physiological changes also influence pharmacokinetics and pharmacodynamics (31). For all these reasons, older people are more at risk of adverse drug-related events (ADE) (32). The annual incidence of ED ADE in the United States was estimated at 4.9‰ of patients over 65 and increased with age (33). ADE accounted for 5.9% of

Table 1 - *Components of comprehensive geriatric assessment and epidemiology.*

	Prevalence in ED	Influence on length of stay	Identification by ED physicians	Mortality
Delirium	10% (77)	No (78) (79)	24% (80)	HR 2.1 at 1 year (81), RR 2.3 at 3 years (82)
Cognitive impairment	20% (17)	Yes (78)	46% (17)	RR 1.7 at 3 years (82)
Depression	27% (83)	No (78)	33% (84)	RR 1.6 after 27 years of follow-up (85)
Functional dependence	Up to 75% (3)	Yes (21)	25% (3)	RR 2.1 at 3 years (82)
Risk of falls	15% (86)	Yes (78)	–	RR 3.2 during following year (87)
Malnutrition	20% (40)	Yes (78)	–	RR 2.8 at 4 years (88)
Polypharmacy (≥5 drugs)	40% (32)	Yes (89)	–	OR 1.9 during hospitalization (89)

HR: hazard ratio; OR: odds ratio; RR: relative risk.

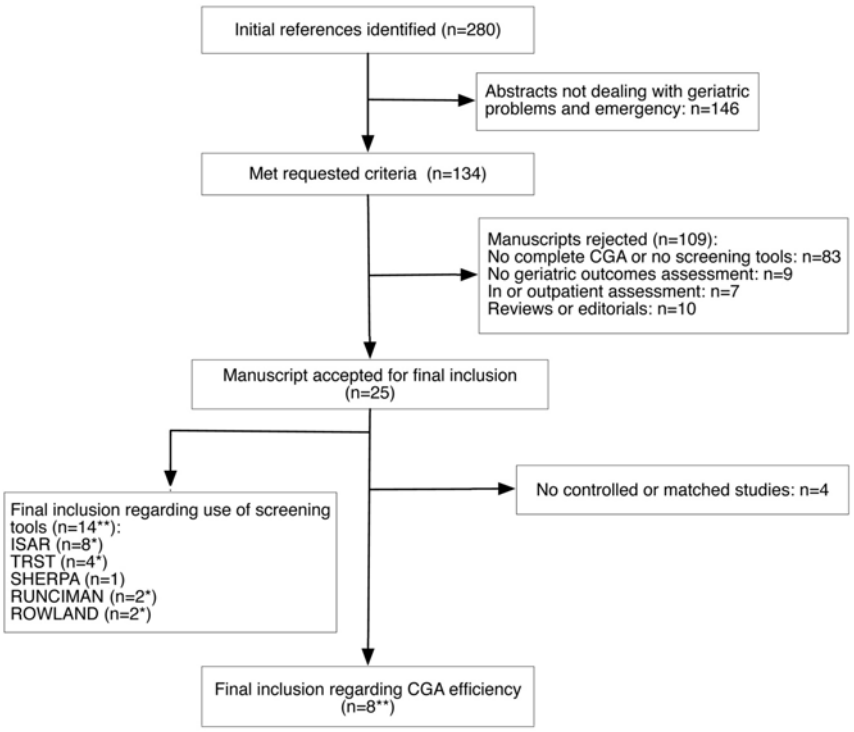

Fig. 1 - *Flow chart of selection methods of studies. CGA: Comprehensive Geriatric Assessment; ISAR: Identification of a Senior at Risk; SHERPA: "Score Hospitalier d'Evaluation du Risque de Perte d'Autonomie" ; TRST: Triage Risk Stratification Tool. *1 paper analyzed 4 different screening tools; **1 paper belongs to both selections (i.e. CGA and screening tools).*

ED visits among older patients admitted for unintentional injuries (33), and may increase the risk of falls by 70% in subjects over 60 (34), lead to fractures in 24% of cases, and to delirium in 14% (35).

By identifying a mean of two new geriatric problems, compared with usual clinical evaluation, CGA may decrease the onset of adverse outcomes (36).

METHODS

Literature search

A systematic English MEDLINE literature search of published cohort studies, case-control studies, case-matched studies and cross-sectional studies without any date limit was performed in December 2009. The following Medical Subject Heading (MeSH) terms were used: "Community Health Nursing", "Emergency Service, Hospital", "Emergency Treatment", "Frail Elderly", "Geriatric Assessment", "Health Services for Aged", "Patient Discharge", "Risk Assessment" and "Triage". They were combined in the following equation: "*((Emergency Service, Hospital[MeSH Major Topic]) AND (Emergency Treatment[MeSH Major Topic]) AND (Patient Discharge[MeSH Major Topic])) OR ((Activities of Daily Living[MeSH Major Topic]) AND (Patient Discharge[MeSH Major Topic])) OR ((Patient Discharge[MeSH Terms]) AND (Risk Assessment[MeSH Terms]) AND (Triage[MeSH Major Topic])) OR ((Frail Elderly[MeSH Major Topic]) AND (Health Services for Aged[MeSH Major Topic]) AND (Community Health Nursing[MeSH Major Topic])) OR ((Health Services for Aged[MeSH Major Topic]) AND (Emergency Service, Hospital[MeSH Major Topic])) OR ((Emergency Service, Hospital[MeSH Terms]) AND (Geriatric assessment[MeSH Major Topic]))*".

Study selection and analysis

The abstracts identified in the literature were evaluated by one reviewer (CEG). For abstracts fulfilling the initial inclusion criteria (subject dealing with geriatric problems in ED), full articles were obtained. Articles with complete CGA (for example, not only fall risk assessment), screening tools validated in ED, adverse geriatric outcome assessment, and no inpatient or outpatient assessment were selected for final analysis. Regarding studies on CGA efficiency, only controlled or matched studies were included.

Study selection is shown on a flow chart (Fig. 1). One hundred and thirty-four of the 280 identified abstracts were selected according to the initial inclusion criteria. Further revision excluded 109 studies, as they did not use complete CGA or screening tools (n=83), did not assess geriatric outcomes (n=9), did not concern patients in ED (n=7), or were reviews or editorials (n=10). In the fi-

nal phase, 4 studies regarding CGA efficiency were excluded because of lack of a control or matched group. Lastly, we included 8 studies on CGA (10, 11, 36-41) and 14 on screening tools (9, 41-53) (1 study belongs to both selections).

RESULTS

Comprehensive geriatric assessment

Seven randomized and one matched controlled trials dealt with CGA in ED and subsequent geriatric intervention (Table 2). One study was conducted in a tertiary hospital (37) and the others in university teaching hospitals. Except in the study by Mion et al. (11), CGA was performed by nurses. Although the authors used various validated tests for CGA, they all included an assessment of mental and functional status, social support, resource utilization, and polypharmacy statement.

Three studies showed no advantage in performing CGA with regard to outcome (functional decline, ED readmission, institutionalization, death) (37, 38, 40). The other five studies showed a reduction in functional decline after CGA in ED (10, 11, 36, 39, 41). Mion et al. (11) found a decrease in institutionalization, which was not confirmed by Caplan et al. (36). In contrast with other studies (11, 36, 39), McCusker et al. (48) described an increase in ED readmission at 30 days, especially for patients without primary physicians. Regarding mortality, no evidence was found that carrying out CGA in ED had any effect.

Table 2 - *Randomized/matched controlled trials studying comprehensive geriatric assessment applied to older people, and its influence on adverse outcomes (functional decline, ED readmission, institutionalization and death).*

Studies (RCT)	Population	Intervention	Outcomes	Results	Limitations
Miller DK 1996 (40)	>65 yrs discharged or hospitalized after ED visit. INT=385/CO=385	CGA in ED by nurses. Referral to community services.	Mortality. Institutionalization. Functional decline. ED readmission at 3 months.	No significant difference.	Not randomized. Recommendations at ED discharge poorly followed (39%). No high-risk patient screening
Gagnon AJ 1999 (38)	>70 yrs. Screening by a hospital admission risk tool. Discharged home. INT=212/CO=215	Nurse case management. Phone call follow-up and home visit every six weeks.	ED readmission. Functional decline. Mortality at 10 months.	Increase of ED readmission. No difference in functional decline or mortality.	No validated tools to identify high-risk patients. Up to 16 weeks between ED visit and intervention.
Basic D 2005 (37)	>70 yrs discharged or hospitalized after ED visit. INT=114/CO=110	CGA in ED by nurses and referral to community services.	ED readmission at 10 days.	No significant difference.	High-risk patient selection according to nurses' subjective evaluation.
Runciman P 1996 (41)	>75 yrs discharged home after trauma. INT=222/CO=192	Home visit for assessment and referral to community services.	BADL and IADL assessment. ED readmissions at four weeks.	14% reduction of IADL dependent patients. No difference in BADL or ED readmissions.	No high-risk patient screening. Post-trauma population. Incomplete CGA.
Mion LC 2003 (11)	>65 yrs. Screening by a high-risk patient tool (TRST score). Discharged home. INT=326/CO=324	CGA in ED by research assistants and referral to community services.	ED readmission. Institutionalization. Death at 30 and 120 days.	Decreased institutionalization at 30 and 120 days for high-risk patients. No effect on ED readmission and death.	Small number of patients admitted to nursing homes.
Caplan GA 2004 (36)	>75 yrs discharged home. INT=370/CO=369	CGA at home by nurses. 4 weeks follow-up by weekly inter-disciplinary team.	Functional decline. Institutionalization. ED readmission. Mortality at 1, 6, 12 and 18 months.	10% reduction of ED-readmission at 18 months (NNT 10). Decrease in functional decline at 6 months. No effect on other items.	No significant limitations.
McCusker J 2001 (10)	>65 yrs. Screening by a high-risk patient tool (ISAR score). Discharged home. INT=178/CO=210	CGA in ED by nurses and referral to community services for high-risk patients (ISAR ≥2).	Functional decline or mortality at 120 days.	45% reduction of functional decline or mortality at 120 days. Increase in ED readmission at 30 days.	No significant limitations.
Guttmann A 2004 (39)	>75 yrs discharged home. INT=2679/CO=2634	CGA in ED by nurses. 14 days follow-up	ED readmission at 1, 8 and 14 days.	Decrease in ED readmission at 8 and 14 days.	No significant limitations.

BADL: Basic Activities of Daily Living; CGA: Comprehensive Geriatric Assessment; CO: Control group; ED: Emergency Department; IADL: Instrumental Activities of Daily Living; INT: Intervention group; ISAR: Identification of a Senior at Risk; NNT: Number Needed to Treat; TRST: Triage Risk Stratification Tool.

Table 3 - *Emergency department validation studies of screening tools used to select high-risk elderly people discharged from hospital.*

Screening tools	Settings	Items	Cut-offs and performances	Outcomes
SHERPA (42)	Two general teaching hospitals (Belgium). Nurses' evaluation. N=550/>70 yrs	History of falls (1 year). Cognitive evaluation (MMSE). Self-perceived health. Age (<75; 75-84; >84 yrs). IADL dependence (Lawton, 7 items).	≥3.5/11.5 Sensitivity 85% Specificity 45%	Functional decline. Hospitalization. Death at 3 months.
Runciman P (41)	ED of university hospital (UK). Nurses' evaluation. N=48/>75 yrs	Recent trauma (few days). BADL dependence (1 item). IADL dependence (2 items). Use of diuretics /Incontinence. Walking problems. Short-term memory problems.	≥2/8 Sensitivity 86% Specificity 38%	ED readmission at 28 days.
Rowland K (51)	ED of university hospital (UK). Nurses' evaluation. N=555/>75 yrs	BADL dependence (2 items). IADL dependence (3 items). Walking problems. Day center/hospital use.	≥4/7 Sensitivity 85% Specificity 28%	ED readmission at 14 days.
TRST (50)	Two urban teaching ED (USA). Self-reported or nurses evaluation. N=647/>65 yrs	Cognitive impairment. Walking/transferring problems. Polypharmacy (>5) Hospitalization (3 months) or ED use (1 month). Lives alone, or no caregiver. Nurses registered concern.	≥2/6 Sensitivity 64% at 30 days, 55% at 120 days. Specificity 63% at 30 days, 66% at 120 days.	ED readmission and Institutionalization at 30 and 120 days.
ISAR (47)	Four ED university-affiliated hospitals (CAN). Self-reported or nurses' evaluation. N=676/>65 yrs	BADL dependence (1 general question). IADL dependence (1 general question). Visual impairment. Cognitive impairment. Previous hospitalization (6 months). Polypharmacy (>3).	≥2/6 Sensitivity 72% Specificity 58%	Death. Institutionalization. Functional decline at 6 months.

BADL: Basic Activities of Daily Living; CGA: Comprehensive Geriatric Assessment; ED: Emergency Department; MMSE: Mini-Mental State Evaluation; ISAR: Identification of a Senior at Risk; SHERPA: "Score Hospitalier d'Evaluation du Risque de Perte d'Autonomie"; TRST: Triage Risk Stratification Tool.

Screening tools to detect high-risk patients

Five screening tools to identify high-risk populations have been developed for patients discharged from ED or hospital, and predict adverse outcomes (9). The ED validation studies of these screening tools, "Score Hospitalier d'Evaluation du Risque de Perte d'Autonomie" (SHERPA), Runciman, Rowland, Triage Risk Stratification Tool (TRST) and Identification of a Senior at Risk (ISAR) (41, 42, 47, 50, 51) are listed in Table 3.

The performance of these screening tools varies. SHERPA has good performance to predict functional decline, hospitalization and death at 3 months, but fails to predict ED readmission (42). The four other screening tools (Runciman, Rowland, TRST, ISAR) show similar initial performance. Recently, Moons et al. conducted a study of 83 patients over 65 in a Belgian teaching hospital and compared these four screening tools (9). They found that the sensitivity of Runciman test decreased within three months from 80% to 59%. In contrast with the original article (specificity of 28%), Moons et al. described the Rowland test as having good specificity (75% at 1 month – 76% at 3 months) and negative predictive value (92% at 1 month – 78% at 3 months) for ED readmission. The TRST is not sensitive for this outcome (9). This was confirmed by a recent prospective study on 788 patients over 65 in three hospitals in Toronto (1 suburban community hospital, 1 urban community hospital, and one urban teaching hospital), which demonstrated that a routinely performed TRST was not sensitive in predicting ED readmission (70% at 1 month – 62% at 3 months) (45). A second data analysis of the study by Mion et al. (50) also showed that the TRST failed to predict functional decline (44). According to Moons et al., the negative predictive value of the ISAR for ED readmission is 100%, 89% and 82% at 14 days, 1 month and 3 months, respectively (9). In an Italian prospective study of 200 patients over 65 in two urban hospitals (1 teaching and 1 tertiary hospital), an ISAR ≥2/6 was strongly predictive of adverse outcomes at 6 months (adjusted OR 3.46, 95% CI 1.68-7.15) (52). As mentioned before, this tool is validated in a two-step approach (10).

The last four selected studies did not deal with adverse outcomes. In a second data analysis of the two studies by

McCuskey et al. (10, 47), the ISAR predicted high use of community health centers (43), was cost-effective (49) and improved communication with primary care services (48). The last study emphasized that some questions of the ISAR may not be appropriate for patients over 75 (53).

DISCUSSION

Value of CGA in the emergency department

Negative studies (37, 38, 40) had several limitations. The study by Miller et al. (40) was not randomized, but matched a control group with an assembled intervention cohort. In addition, the recommendations for patients at ED discharge were poorly followed (39% in intervention group). The authors suggested that it was due to poorly coordinated health providers in the United States. There was no screening of high-risk patients. Gagnon et al. (38) tried to identify high-risk patients, but did not use a validated screening tool, and concluded that their selection criteria might not have been sensitive enough; nor did they deliver the intervention during or immediately after the ED visit, which could be delayed for up to 16 weeks. In the study by Basic et al. (37), selection of high-risk patients was dependent on nurses' evaluations, but was not based on a validated tool. The intervention and control groups were not similar as regards gender and health status at inclusion (sicker intervention group), and the short follow-up of 10 days may explain the negative results. Thus, negative results may originate, at least partly, from study limitations.

The other five studies (10, 11, 36, 39, 41) found some positive effects, but had various designs. Runciman et al. (41) showed a reduction in functional decline, but the lack of high-risk patient identification, the specificity of the studied population (post-trauma) and the incomplete CGA used (only BADL/IADL/mental status examination) explained the negative effect concerning ED readmission. The others were methodologically stronger and confirmed reduced functional decline after CGA in ED (10, 11, 36, 39).

Regarding the other adverse outcomes, the results are more controversial. Mion et al. (11) found a decrease in institutionalization, but the small number of patients admitted to nursing homes during follow-up weakens the significance of these results. Despite the lower age of participants, studies with screening of high-risk patients had better results, especially as regards functional decline (10, 11).

Collectively, these results demonstrate that screening of high-risk patients is more efficient that age-based screening, and that CGA performed in ED improves adverse outcomes. As CGA is time-consuming and cannot be applied routinely in ED, it should be reserved for high-risk patients, i.e. ones for whom it is most efficient (39).

Screening tools to identify high-risk patients needing CGA

An ideal screening tool must be easy to use, rapid and simple, have good sensitivity and negative predictive value, and good reproducibility. The SHERPA takes too long to perform in ED, as it includes a Mini-Mental State Evaluation (MMSE) (42). The Runciman test is longer and more complex than the others. The Rowland test does not contain a mental evaluation. The only two screening tools validated and studied with a two-step approach (screening tool in order to identify high-risk patients, followed by CGA), are TRST and ISAR (47, 50). As regards recent TRST results, this tool is not accurate enough for routine use in ED (44, 45). Consequently, the best screening tool seems to be the ISAR. It allows an exhaustive overview of geriatric risk factors, and identifies high-risk patients for adverse outcomes with good test-retest reliability (46). It can be performed in 2 minutes or integrated in nurses' general evaluation.

PRACTICAL SUGGESTIONS FOR APPLICATION OF CGA IN ED

Short assessment of CGA in ED

Even with a two-step approach, the application of CGA is time-consuming. Some shorter assessment tools for CGA have been validated in ED (Table 4).

The Confusion Assessment Method (CAM) contains 4 features and is the most widely used instrument to diagnose delirium, with excellent performance (54). The MMSE is used worldwide and validated for cognitive impairment screening in ED (55). However, it takes up to 14 minutes to finish (56), and is therefore difficult to implement as part of CGA. The Mini-Cog is a rapid screening test which can be integrated into routine history and examination without increasing the time needed to evaluate the patient (56). It encompasses a three-item recall and a clock drawing test. It requires intact vision and the ability to write. The Quick Confusion Scale (QCS) can be done faster than the MMSE (it takes about 2 minutes) and does not require writing or reading ability (57). The QCS consists of six questions, including temporal orientation, a working memory task, flexibility testing, and a short-term memory task. According to the literature, it is actually the test with the best performance/time ratio in ED.

The most commonly used tests to detect depression in the elderly are the Geriatric Depression Scale, with 30 (GDS-30) and 15 items (GDS-15), which are similar in terms of sensitivity (89%) and specificity (62%) (58). However, they take too long to perform routinely in ED. Two shorter questionnaires are validated in ED. Hustey et al. (59) studied a 2-question score in patients over 70 at ED admission. Similarly, the Emergency Depression Screening Instrument (ED-DSI), a 3-question score, was tested by Fabacher et al. (60). The two types of score had similar results and limitations. The study groups were not randomized and relatively small (n=267 and 103, respectively). In addition, GDS was used as the gold standard for diagnosis, instead of a formal psychiatric interview focusing on DSM-IV criteria. Hustey's ques-

Table 4 - *Proposed validated tools for comprehensive geriatric assessment in emergency department.*

Tools	Topics	Cut-offs	Performance	Time
CAM (54)	Delirium	≥3/4 (items 1+2 and item 3 or 4)	PPV 100% and NPV 97%	<5 min (90)
Mini-Cog (91)	Cognition	≤2/5	Sensitivity 73% and NPV 93% compared with MMSE ≤23/30 (56)	
QCS (57)	Cognition	≤11/15	Correlation with MMSE ≤23/30 (r=0.783)	2 min
Hustey's questionnaire (59)	Depression	≥1/2	Sensitivity 84%, Specificity 61% and NPV 95% compared with GDS-15 ≥5	2 min
ED-DSI (60)	Depression	≥1/3	Sensitivity 89%, Specificity 73% and NPV 94% compared with GDS-30 ≥10	
OARS ADL (64)	Functional status	–	–	5 min
One leg balance (92)	Falls	≤5 sec	RR 3 of injurious falls during next 3 yrs	5 min
Carpenter's score (93)	Falls	=4/4	RR 10.3 of falls during next 6 months	2 min
DETERMINE (68)	Malnutrition	≥3	Sensitivity of 66% and NPV 88% compared with BMI ≤18.5 kg/m^2	5 min
STOPP (74)	Polypharmacy	–	–	3 min

ADL: Activities of Daily Living; CAM: Confusion Assessment Method; ED_DSI: Emergency Depression Screening Instrument; DETERMINE: DETERMINE Your Nutritional Health Checklist; MMSE: Mini-Mental State Evaluation; OARS: Older American Resources and Services; NPV: Negative Predictive Value; PPV: Positive Predictive Value; QCS: Quick Confusion Scale; RR: Relative Risk; STOPP: Screening Tool of Older People's Potentially Inappropriate Prescriptions.

tionnaire is easier to use, in view of the similar performance, the fact that it is 1 question shorter, and has been validated in more patients than the ED-DSI.

Functional status is assessed by BADL and IADL. The widely used anamnestic scores to assess BADL are the Barthel index (10 items) (61) and the Katz index (6 items) (62). The Barthel index takes too long and is too complex to be routinely used in ED. The Katz index includes six items: bathing, dressing, toilet use, transfer, feeding and continence. For IADL, the most widely used tool is the Lawton scale, which explores 9 items: using the telephone, travel, shopping, meal preparation, housework, taking medicine and management of finances, laundry and mode of transportation (63). The Older American Resources and Services (OARS ADL) questionnaire has the advantage of combining the two indexes and of being validated in ED. It includes the Katz index items ("walking" item added) and 7 items from the Lawton scale (exclusion of the items "laundry" and "mode of transportation") (64). The total score ranges from 0 to 28. Although the cut-off is not clearly determined (65), each point under the maximum score indicates a functional disability which must be taken into account for further intervention or recommendations. This scale can be performed in 5 minutes.

The timed Get up and Go test is used to assess risk of falls and balance improvement after physiotherapy (66). However, it requires space, and the fact that the patient must be able to walk can make this test difficult or impossible to perform in ED. The "one leg balance" test is defined as the ability to stay on one leg unsupported for 5 seconds. This is a very short and simple test, and the patient only has to be able to stand up. Carpenter et al. reported four anamnestic risk factors predicting falls during the forthcoming 6 months: non healing foot sores, reporting a fall in the past, unable to cut own toenails, and self-reported depression. Thus, the risk of falls could be appreciated in ED by combining a functional test like "one leg balance", and Carpenter's score. However, no studies have actually been done combining these two tests.

For malnutrition screening, the Mini Nutritional Assessment (MNA) (67) can be done in 10-15 minutes, and includes measurement of weight and height for Body Mass Index calculation (BMI). These limitations make its use difficult in ED. The DETERMINE Your Nutritional Health Checklist (DETERMINE) is a self-administered list of ten questions covering different risk factors for malnutrition (68). Four questions cover dietary concerns, four general health assessment, and two social and economic issues. Each question is scored according to its weight defined by the authors. Patients with a total score ≥3/21 are at moderate risk of malnutrition, and those with a score ≥6/21 are at high risk. Visvanathan et al. found better sensitivity of 66% and negative predictive value of 88%, when a total score ≥3 was compared with a BMI ≤18.5 kg/m^2 (69). Similarly, another study showed sensitivity of 59% when a cut-off ≥6 was compared with a BMI ≤20 kg/m^2 (70). Nevertheless, BMI underestimates malnutrition in ED (71). The DETERMINE list was not constructed to be a diagnostic tool, and should therefore be used only for pre-screening, followed by further nutritional investigations if necessary (72).

It is critical to take advantage of the ED visit to review medication list and make suggestions for improvements, in order to reduce ADE. Prescription of inappropriate drugs

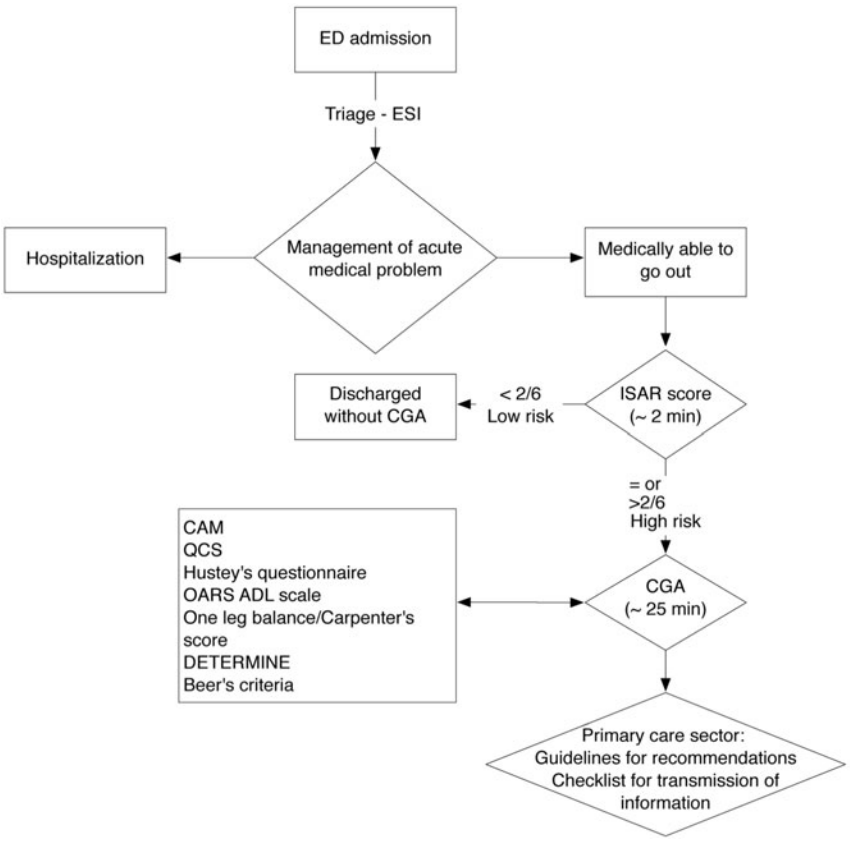

Fig. 2 - *Proposed algorithm to apply in emergency department for patients over 65 years. ADL: Activities of Daily Living; CAM: Confusion Assessment Method; CGA: Comprehensive Geriatric Assessment; ED: Emergency Department; ESI: Emergency Severity Index; ISAR: Identification of a Senior at Risk; OARS: Older American Resources and Services; QCS: Quick Confusion Scale; STOPP: Screening Tool of Older People's potentially inappropriate Prescriptions.*

(PID) is associated with a significant increase in ADE (73). A Screening Tool of Older People's potentially inappropriate Prescriptions (STOPP) was recently described (74). STOPP is based on physiological systems, and includes 65 criteria for avoidance of certain drugs interactions in older people. Gallagher et al. showed that STOPP could identify twice more PID than Beer's criteria (75). However, there is no definite evidence that its use can decrease the incidence of ADE.

Organization of home discharge

As CGA will highlight some geriatric problems and new disabilities, it is crucial to transmit recommendations to primary care physicians and nurses. At present, there are no standardized guidelines to establish such recommendations, and their development would lead to great improvements in home discharge organisation for older patients (41), which have to be personalized and depend on the type of disability. In the literature, there are several methods of organizing the care of older patients after discharge. ED physicians can simply make suggestions to healthcare providers, or activate some specific geriatric ambulatory programs, like falls prevention or cognitive training programs. It is not clear which design gives the best results. For example, McCusker et al. (10) referred to primary care and home services by routine notification to general medical practitioners (GPs) without special follow-up, and obtained a reduction in functional decline. Moreover, such approaches are closely dependent on healthcare systems, which differ between countries.

Communication between the primary care sector and ED must be improved. In a recent study of 79,000 patients over 65 and discharged after an ED visit, McCusker et al. (12) showed that the ED team received medical information from family doctors in only 5% of cases at ED admission. In the same way, ED team sent the medical information of only 40% of patients to family doctors. Poor communications between ED and home care services may worsen the medical follow-up (76). The above authors suggested using a check-list about how, which and when ED physicians and nurses should inform primary care providers, to improve communications. GPs and public health nurses must be informed by telephone or fax to ensure rapidity of transmission. In this way, liaison nurses also have an important role to play to ensure the continuity of care.

According to the above, we propose an algorithm (Fig. 2) to be applied in ED for patients over 65. After man-

agement of the acute medical problem and if the patient is believed suitable for discharge, a two-step approach is used: determination of high-risk patients by ISAR score (2 min), followed by CGA (25 min). Results lead to personalized recommendations based on guidelines, and the use of a check-list to improve communications between ED and the primary care sector.

CONCLUSION

CGA in ED is efficient in decreasing functional decline (10, 11, 36, 39), ED readmissions (11, 36, 39) and possibly nursing home admissions in high-risk patients (11). However, it takes too long for routine performance in ED. Some ED-validated screening tools, shorter and more routinely applicable than the CGA (like the ISAR), can be applied in order to detect high-risk patients (47). In high-risk patients (defined as those with an ISAR ≥2/6), CGA should be performed and subsequent recommendations transmitted to primary care professionals. Further research should pursue validation of the two-step approach, to lead to the development of guidelines for discharge management, and to assess the influence of these guidelines on outcomes.

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