Observatory of elderly people cared in pre-hospital

Observatoire des sujets âgés pris en charge en pré hospitalier

Saida Zelfani, Slim Ben Dlala, Hela Manai, Rafika Ben Chihaoui, Sawsen Abidi, Mounir Daghfous

SAMU/CAMU / Université Tunis El Manar/ faculté de médecine de Tunis

RÉSUMÉ

Introduction : les services mobiles d'urgence et de réanimation (SMUR) prennent en charge un nombre croissant de sujets âgés.

Objectif : Evaluer la mortalité et l'autonomie des patients âgés de 65 ans et plus après l'intervention du SMUR

Méthodes : Il s'agissait d'une étude observationnelle prospective multicentrique durant une année. Nous avons inclus des patients âgés de 65 ans et plus qui ont été pris en charge en pré hospitalier. Nous avons étudié: les critères démographiques, les soins pré-hospitaliers, la gravité (scores IGSA et GCS), l'autonomie initiale et à 3 mois ont été évalués à l'aide du score de Katz. Une analyse multivariée a été réalisée pour identifier les facteurs prédictifs de mortalité à 24 heures.

Résultats : Nous avons inclus 385 patients. L'âge moyen était de 81 ± 8 ans et le sex-ratio était à 1,08. Trente-huit (10%) patients étaient en arrêt cardiaque à l'arrivée de l'équipe SMUR dont 50% ont été réanimés sans récupération. Le score IGSA était de 7 [5-10] à l'examen initial versus 6 [4-7] à l'arrivée à l'hôpital (p <0,01). L'autonomie initiale était de 2 [0-6] contre 3 [0-6] à 3 mois avec p = 0,02. Quatre-vingt-quatorze patients (33%) ont retrouvé leur autonomie initiale après l'épisode aigu. À 24 heures, le taux de mortalité était de 9% (n = 32). En analyse multivariée, le facteur prédictif indépendant de mortalité était GCS <8 avec un OR ajusté = 9,22, IC à 95% [3,44-24,70]; p <0,001

Conclusion: En dehors de l'arrêt cardiaque, la survie des personnes âgées pris en charge en pré hospitalier était encourageante. À moyen terme, un tiers d'entre eux ont retrouvé leur autonomie après l'épisode aigu. Ces éléments suggèrent une intégration réussie dans le système d'urgence.

Mots-clés

Pré hospitalier, sujets âgés, mortalité, autonomie

SUMMARY

Introduction : Emergency medical services (EMS) supports an increasing number of elderly patients.

Aim: To evaluate outcome and autonomy of patients aged 65 and older who managed in the prehospital theater

Methods : We conducted a prospective observational multicenter study over one year (October 2015 -September 2016). We included patients aged 65 or older managed in the pre hospital setting. We studied: demographic criteria, pre-hospital care, severity (IGSA score and GCS), baseline and 3-month autonomy was assessed using the Katz score. Multivariate analysis was performed to identify predictive factors of mortality at 24 hours.

Results : we included 385 patients. Average age was 81 ± 8 years and sex ratio was equal to 1.08. Thirty eight (10%) patients were in cardiac arrest at the arrival of EMS team and 50% of them were resuscitated without recuperation. The IGSA score was 7 [5-10] on the initial examination versus 6 [4-7] on the arrival at the hospital (p<0.01). Baseline autonomy was 2 [0-6] versus 3 [0-6] at 3 months with p = 0.02. Ninety four patients (33%) regained their baseline autonomy after the acute episode. At 24 hours the mortality rate was 9% (n=32). In multivariate analysis, the independent predictor factor of mortality was GCS <8 with an adjusted OR=9,22 ;95%CI[3,44-24,70] ; p<0.001

Conclusion: Except out of hospital cardiac arrest, the survival of elderly subjects managed by EMS teams was encouraging. In the medium term, one-third of them regained their autonomy after the acute episode. These elements suggest successful integration into the emergency system.

Key-words

Pre-hospital, Elderly persons, Mortality, Autonomy

INTRODUCTION

Pre-hospital emergency medical services (EMS) provide basic life support to patients and critical care transportation and the main aim of this service is to avoid worsening the health condition of the patient on the way to the hospital [1]. Older adults are the chief users of EMS [2]. Tunisia is experiencing a demographic transition characterized by the aging of the population. In fact, the population aged 60 and over increased from 5.5% in 1966 to 11.4% in 2014 [3]. Emergency conditions that require the use of ambulance services, such as hypertension, coronary diseases, chronic obstructive pulmonary diseases, neurovascular diseases and traumas have also risen along with the increasing patient age [4].

This population is characterized by the coexistence of one or more pathologies with their own psychological and/or social components. The intrication of all these elements in a physiological context due to aging makes the care of the elderly difficult. Emergency physicians needs scores to assess autonomy and to predict mortality of the elderly after integration into the emergency care circuit.

The aim of this study was to analyze the characteristics of these older people and to determine their outcome in terms of mortality and autonomy after the pre hospital EMS use.

METHODS

This was a prospective observational multicenter study performed at SAMU 01 of the North Est of Tunisia between October 2015 and September 2016. The regulation of the SAMU 01 orders and coordinates the coordination of 5 mobile EMS allowing the availability of six pre hospital EMS teams : two in Tunis, Marsa, Ben Arous, Bizerte and Nabeul.

All decisions to engage EMS teams were made by the regulating physician after telephone questioning and according to the reason for call. The medical regulation always ensures that the elderly subject presents a vital distress, so an EMS team moves to the site.

We prospectively included all patients aged more than 65 years and benefited from a primary intervention by one of the four EMS teams (two from Tunis, Ben Arous and Marsa)

We did not include elderly subjects who benefited from secondary interventions and patients who did not require EMS intervention. They were excluded patients evacuated by their own means before the arrival of the ambulance and elderly for which the ambulance was not available

Data collection

Data collection was performed by the regulator physician using a specific form. The data collected were: demographic characteristics, pathological antecedents, resuscitation procedures performed, the EMS team's decision to transport or to leave patient on the site. The initial assessment of the patients was made by Ambulatory simplified severity index (IGSA) score and Glasgow Coma Scale (GCS) [5].

Initial and 3-month autonomy was assessed using the Katz score [6]. This score includes six items of daily life (hygiene, dressing, going to the toilet, locomotor activity, continence, eating meals) rated from 0 to 1 depending on the patient's autonomy. A score equal to six corresponds to a complete autonomy of the patient

All patients were followed from day one to 90 days after pre hospital management and evolution findings were prospectively collected by phoning patients or family and / or contacting the receiving structure (emergency, intensive care units,…).

Statistical analysis

Variables are expressed as average±standard deviation or median and interquartile range as appropriate. Categorical variables were expressed in pourcentages. Comparison between two independent series averages were made using the Student's independent T-test and in the case of non-validity, by the non parametric Mann-Whitney test. Comparison of percentages on independent series were made by the Pearson chi-square test, and in case of non-validity, by Fisher's exact test. The search for risk factors was performed by calculating the Odds Ratio (OR). To determine the threshold value at which to cut the quantitative variable (cut-off value), we have established Receiver Operating Characteristics (ROC) curve. In order to identify the risk factors directly related to the event, we conducted a multivariate analysis in logistic regression and a 95% confidence interval (CI) as used. Survival data were studied by establishing survival curves according to the Kaplan Meier method. In all statistical tests, a p value less than 0.05 was considered as statistically significant.

RESULTS

Characteristics of the population

During the study period, we included 385 patients. Average age was 81 ± 8 years. Patients aged more than 85 years represented 41% of the population (n=158). The sex ratio was 1.08

Calls came from homes of patients in 90% of cases and were made through a physician in 12% of cases. The reasons of calling an ambulance were as follows: neurological distress in 40% of cases, respiratory distress in 25%, traumatology in 14%, chest pain in 10% and home nursing in 6% of cases.

Medical history of our patients showed that 73% suffered from at least one chronic pathology and 27% had no medical history. The table 1 shows the general characteristics of the population.

Table 1 : General characteristics

variables		
Average age	years±SD	81±8
Men	%	52
Comorbidities		
hypertension	n(%)	339(88)
diabetes	n(%)	312(81)
COPD	n(%)	166(43)
Coronary artery disease	n(%)	77(20)
Renal failure	n(%)	65(17)
Previous stroke	n(%)	58(15)
neoplasia	n(%)	15(4)
Congestive heart failure	n(%)	8(2)
Diagnosis		
Acute respiratory failure	n(%)	139(36)
Acute coronary syndrome	n(%)	77(20)
stroke	n(%)	39(10)
Cardiac arrest	n(%)	39(10)
Septic shock	n(%)	23(6)
hypoglycemia	n(%)	19(5)
Traumatology	n(%)	19(5)
Cardiogenic shock	n(%)	11(3)
Hypovolemic shock	n(%)	11(3)
Other (neurology, renal)	n(%)	8(2)

COPD : Chronic obstructive pulmonary disease

SD : standard deviation

The IGSA score was 7 [5-10] on the initial examination versus 6 [4-7] on the arrival at the hospital and there was a statistically significant difference (p<0.01)

Thirty eight (10%) patients were in cardiac arrest at the arrival of EMS team and 50% of them were resuscitated without recuperation.

Forty-two patients (11%) needed catecholamine use in the pre hospital phase. Eight patients were thrombolyzed **for an acute coronary syndrome with ST elevation** without any complication.

At the end of the prehospital intervention the patients were oriented as follows :

- All patients found in cardiac arrest died at the scene
- Twenty-one patients (5%) were left alive : five refused transportation and 16 did not require transportation to the hospital
- Three hundred and twenty six (85%) patients were transported to a hospital : 320 (83%) were admitted to an emergency department and six were admitted directly to the cardiology intensive care unit

Mortality

Twenty-four hours after out of hospital management, the intra-hospital mortality rate was 9% (n=32). For patients not transported to the hospital, no death was noted.

A comparison between the group of survivors versus the group of the deceased shows that the two groups were comparable in terms of sex ratio, comorbidities and initial autonomy. The deceased patients were significantly older, with a lower GCS and a higher IGSA score in pre-hospital phase. The table 2 shows the comparison of the two groups.

We analyzed the ROC curve for the GCS (figure 1)

1-Specificity
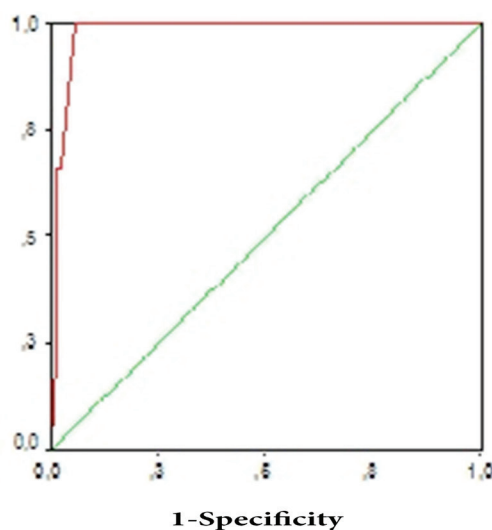
Diagonal segments are generated by links

Figure 1 : ROC curve for glasgow coma scale as a prognostic tool

Table 2 : Comparison between dead and surviving patients

	Dead patients n=32	Surviving patients n=315	p
Age mean±SD (years)	90±6	80±8	0.001
Sexe-ratio (M/F)	21/11	210/105	NS
Baseline autonomy mean±SD	4.22±2.04	4.28±1.84	NS
Hypertension n (%)	14 (44%)	142 (45%)	NS
Diabetes n (%)	7 (22%)	129 (41%)	NS
Stroke n (%)	4 (12.5%)	41 (13%)	NS
Heart failure n (%)	2 (6%)	16 (5%)	NS
IGSA mean±SD	10.56±1.74	5.64±1.3	<0.001
GCS mean±SD	5±2	13±2	<0.001

SD : standard deviation
IGSA : Ambulatory simplified severity index
GCS : Glasgow Coma Scale

A cut-off at 8 was predictive of intra-hospital death. The Area Under the Curve was 0.98 (p=0.001). Multivariate analysis identified a GCS less than 8 as independent predictor of in-hospital death : adjusted OR=9,22 ;95%CI[3.44-24.70] ;p<0.001

Autonomy

The median of nitial autonomy was 2 [0-6]. Forty-three percent (n = 149) of patients had a score of 6 and 24 patients (7%) were dependent with Katz score equal to zero. At three months we could not contact 27 patients. Ninety four patients (33%) regained their baseline autonomy after the acute episode.

Median Katz score at 3 months was 3 [0-6] with a significant difference (p = 0.02) from baseline autonomy. The table 3 shows the distribution of the population according to Katz score before and after pre hospital EMS care.

Table 3 : Distribution according to baseline Katz score and after prehospital care

Katz score	Baseline N =315 n(%)	At 3 months N = 288 n(%)
0-1	28 (7)	15 (5.5)
1.5-2	42(12)	20(7)
2.5-3	38(11)	38 (13)
3.5-4	49(14)	58 (20)
4.5-5	45(13)	32(11)
5.5-6	149(43)	125 (43.5)

DISCUSSION

Our study confirms utility and efficacy of full access of elderly persons to the emergency system. At 3 months, patients aged 65 and over who are managed in the prehospital sitting re-integrate their original residence and their state of autonomy has not been degraded by the acute episode.

Pre-hospital care providers could improve care for older adults by initiating the screening process and facilitating referral or transport to the most appropriate service [7].

Furthermore, if we considered only cardiac pathologies (coronary or rhythmic), this finding is even more obvious. Indeed, patients hospitalized in intesive care unit receive maximum treatment and their future is excellent. Acute coronary syndrome or non-coronary heart diseases are independent survivors factors at three months [8].

In the context of coronary heart disease, the recommendations [9] are based on a strategy of pharmacological management and revascularization of coronary heart disease in the octogenarian identical to the younger subject.

Other study showing showing that the use of orotracheal intubation during prehospital management of patients over 75 years of age with acute lung disease [10] or invasive techniques (thrombolysis [11] or angioplasty [12]) in the management of the coronary pathologies of this same population improved survival without degrading the quality of life for survivors.

These results are supported by Duchateau et al [13-15] who justify the use of maximum therapeutic attitude when pre-hospital managing of acute illnesses in patients with 80 years and over.

In addition, specific management adapted to the pathology of elderly patients, reduce the rate of hospitalization in the short term [16,17]. However, the access to intensive care services still limited for this population [9,18,19] as demonstrate in our study (83% were oriented to an emergency department).

The age still being a limiting factor to admission in intensive care services [20].

The results of our study can contribute to the evolution of this public health problem by

promoting the access of elderly patients to hospital services adapted to the managment of this population. In the other hand, the passage by an emergency service is needful in particular

for patients without initial vital distress but for whom

acute pathology is suspected, referred to an emergency service for assessment and observation; the critical care unit adapted to the suspected pathology being informed of their arrival and able to take care of them if necessary. The identification of criteria for appropriate care is important. This study helped to establish mortality factors at 24 hours. Among these, the state of autonomy when taking charge seems to be a way particularly prognostic [21]. In this area, during triage or in the pre-hospital setting, identifying whether a patient is fit or frail may be the primary concern and could lead to directing care [7].

At the conference of consensus of the French Society of Emergency Medicine on the care of the elderly person more than 75 years in the emergency department in 2003, a frailty screening score was selected: the Identification of Senior at Risk (ISAR) score, based on six closed questions (yes or no), one patient being considered to be at risk of an undesirable event, so fragile, with more two positive answers [8]. In the pre-hospital setting, it may be enough to know whether someone is fit or frail; however, later in the care process when intervention options are being considered, a more precise measure may be useful in directing treatment decisions. An older person who is fit but acutely unwell can benefit from aggressive "usual care". For the older person who is frail with multiple co-morbidities and acutely unwell, complex care brought by a multidisciplinary team is recommended [22].

Limitations

This study presents a limitation of a small number of patients. Larger-scale studies are needed. Furthermore, autonomy may be difficult to measure. Rigourous interviews of the family and relatives were conducted in order to minimize this bias.

Conflicts of interest

Authors declared they have no conflict of interest

CONCLUSIONS

Excluding out of hospital cardiac arrest, the survival rate of elderly subjects supported by the EMS teams was encouraging. In the medium term, third of them regained their autonomy after the acute episode. Age alone is not a predictor of mortality, but must be considered with the previous health status and the autonomy of the subjects at the time of this care. These elements suggest successful integration into the emergency system.

REFERENCES

1. Keskinoglu P, Sofuoglu T, Ozmen O, Gunduz M, Ozkan M. Older people's use of pre-hospital emergency medical services in Izmir, Turkey. Arch Gerontol Geriatr 2010;50:356–360.
2. Shah MN, Bazarian JJ, Lerner B, et al. The epidemiology of emergency medical services use by older adults: an analysis of the national hospital ambulatory medical care survey. Acad Emerg Med 2007;14(5):441–48.
3. Ben Salem K, Ben Abdelaziz A. The Maghreb demographic transition : Tunisia case study. Tunis Med 2018;96(10/11):754-59
4. Schnittker J. Chronic illness and depressive symptoms in late life. Soc Sci Med 2005;60(1):13–23
5. Le Gall JR, Loirat P, Alperovitch A, Glaser P, Granthil C, Mathieu D, et al. A simplified acute physiology score for ICU patients. Crit Care Med 1984;12:185–90.
6. Katz S, Ford AB, Moskowitz RW, Jackson BA, Jaffe MW. Studies of illness in the aged. The index of ADL: a standardized measure of biological and psychosocial function. JAMA 1963;185:914–9.
7. Goldstein JP, Melissa KA, Andrew T. Frailty in Older Adults Using Pre-hospital Care and the Emergency Department: A Narrative Review. Can Geriatr J 2012;15(1):16-22
8. Josseaume J, Duchateau FX, Burnod A. Observatory of the elderly over 80 years supported by the mobile emergency and resuscitation service. Ann Fr Anesth Reanim 2011;30:553-58
9. Hanon O, Komadja M. Consensus d'experts de la Société française de gériatrie et gérontologie (SFGG) et de la Société française de cardiologie (SFC) sur la prise en charge de la maladie coronaire chez le sujet âgé, 2009.
10. Adnet F, Le Toumelin P, Leberre A, et al. Inhospital and long-term prognosis of elderly patients requiring endotracheal intubation for life-threatening presentation of cardiogenic pulmonary edema. Crit Care Med 2001;29:891–5.
11. White HD. Thrombolytic therapy in the elderly. Lancet 2000;356:2028–30.
12. De Boer MJ, Ottervanger JP, van't Hof AW, et al. Myocardial Infarction Study Group. Reperfusion therapy in elderly patients with acute myocardial infarction: a randomized comparison of primary angioplasty and thrombolytic therapy. J Am Coll Cardiol 2002;39:1723–8.
13. Duchateau FX, Burnod A, Josseaume J, Pariente D, Mantz J. The benefits of out of- hospital advanced life support in elderly. JAGS 2010;58:606–8.
14. Leroy C, Ricard-Hibon A, Chollet C, Marty J. Out-of-hospital management of elderly patients. Ann Fr Anesth Reanim 2003;22:183–9.
15. Duchateau FX, Burnod A, Dahmani S, Delpierre S, Ricard-Hibon A, Mantz J. Outof- hospital interventions by the French Emergency Medical Service are associated with a high survival in patients aged 80 years or over. Intensive Care Med 2008;34:1544–5.
16. Stukel TA, Alter DA, Schull MJ, Ko DT, Li P. Association between hospital cardiac management and outcomes for acute myocardial infarction patients. Med Care 2010;48:157–65.
17. Dedhia P, Kravet S, Bulger J, et al. A quality improvement intervention to facilitate the transition of older adults from three hospitals back to their homes. J Am Geriatr Soc 2009;57:1525–740
18. Fleming C, D'Agostino RB, SelkerCenter HP. Is coronary-care-unit admission restricted for elderly patients? A multicenter study. Am J Public Health 1991;81:1121–6.
19. Garrouste-Orgeas M, Boumendil A, Pateron D, et al. Selection of intensive care unit admission criteria for patients aged 80 years and over and compliance of emergency and intensive care unit physicians with the selected criteria: an observational, multicenter, prospective study. Crit Care Med 2009;37:2919–28.
20. Sprung CL, Geber D, Eidelman LA, et al. Evaluation of triage decisions for intensive care admission. Crit Care Med 1999;27:1073–107.
21. Miró O, Llorens P, Martín-Sánchez FJ, et al. Short-term prognostic factors in elderly patients seen in emergency departments for acute heart failure. Rev Esp Cardiol 2009;62(7):757–64.
22. Rockwood K, MacKnight C, Bergman H. Measuring frailty in geriatric patients. CMAJ 2006;174(3):353–54.