Research Article

Pathways of Elderly People Aged 75 and Over Hospitalized in the Geriatric Department of the University Hospital of Bordeaux

Iban Larrouture[1], Eric Ouattara[1], Aurélie Borde[1], Nathalie Ong[1], Hanta Ramaroson[1], Guillaume Caridade[1], Élisabeth Capdenat-Raymond[1], Delphine Gabillard[1], Nathalie Salles[2], Véronique Gilleron[1,3]

1. Medical Information Department, Medical Information Analysis and Coordination Unit (UCAIM-DIM), Centre Hospitalier Universitaire de Bordeaux, Bordeaux, France; 2. Clinical Gerontology Unit, University Hospital Center Bordeaux, France; 3. Inserm U1219 / Bordeaux Population Health Research Center, Population Health trAnslational Research (PHARes), University of Bordeaux, Bordeaux, France

Background: Studies have shown that extended stays in Emergency Departments (ED) are detrimental to the health of elderly people. We aimed to compare Unscheduled Direct Admission (UDA) with admission after entry through the ED (EDA) for patients aged 75 and over, hospitalized in geriatrics at the Bordeaux University Hospital, between 2017 and 2019.

Methods: The study data were extracted from the hospital discharge database and the hospital information system. We compared in-hospital mortality and the modalities of discharge among UDA and EDA patients. A Cox proportional hazard model and a multinomial logistic regression were used to explore in-hospital mortality and the modalities of discharge, respectively. Missing data were handled by multiple imputation procedures.

Results: Between 2017 and 2019, 2,416 patients aged 75 and over were admitted for unscheduled hospitalization to geriatrics, including 669 (28%) UDA and 1,747 (72%) EDA. The UDA patients were younger (86.9 *vs* 87.7 years old, p=0.002), had fewer acute diseases (43% *vs* 79%) and neurological diseases than EDA (24% *vs* 30%, p=0.003). They also had a shorter length of stay on average (14.3 vs 15.9, p=0.0004). The UDA patients who were discharged alive more often returned home (83% *vs* 75% for EDA), while EDA patients were more often transferred to rehabilitation (17% *vs* 10% for UDA). The UDA patients, hospitalized for hematological diseases, were less likely to be transferred to rehabilitation (Odds Ratio: 0.10; 95% Confidence Interval [0.01-0.88]). The adjusted risk of death was not significantly different in UDA patients compared to EDA patients (HR = 1.00 [0.54;1.85]).

Conclusions: The mortality and discharge rates did not differ between UDA and EDA patients. However, the length of hospital stay was longer for patients admitted through the Emergency Department. The UDA

should be the admission pathway for elderly patients to relieve congestion in Emergency Departments.

Corresponding author: Iban Larrouture, iban.larrouture@chu-montpellier.fr

Brief summary

In recent years, emergency departments (ED) have faced increasing patient flows. Waiting times in ED are also becoming longer, with an impact on elderly care. At this time, the Unscheduled Direct Admissions (UDA), which is defined as an admission to full or day hospitalization without prior entry by an emergency structure, is arousing increasing interest from the public authorities. The aim of this study was to compare in-hospital mortality and outcomes at the end of hospitalization in patients aged 75 and over, during an unscheduled hospitalization, according to their pathway of admission, directly or after entry by the ED of the Bordeaux University Hospital, between 2017 and 2019.

This study shows that UDA-patients have the same outcome as ED-admitted patients (EDA-patients) at the end of their stay in terms of in-hospital mortality and discharge to home or to other health establishments. Analysis in subgroups of patients according to diseases at admission also did not show differences in in-hospital mortality between UDA-patients and EDA-patients. Moreover, UDA-patients were different from EDA-patients in terms of admission causes and age. Finally, EDA-patients logically had a longer hospital stay than those admitted directly.

Abbreviations

- ED: Emergency Departments
- UDA: Unscheduled Direct Admission
- EDA: Admission through the Emergency Department
- PMSI : Program of Medicalization of the Information System
- SIH: Hospital Information System
- MCO: Medicine, Surgery and Obstetrics
- ADL: Activities of Daily Living
- ICD10: International Classification of Diseases 10th revision
- MMSE: Mini Mental State Examination
- MAR: Missing At Random
- MCAR: Missing Completely At Random
- OR: Odds Ratio

- US: United States

Introduction

Over the last few years, Emergency Departments (ED) in France have faced an increasing flow of patients[1]. Several studies have shown that waiting time in the ED is detrimental to elderly people because it leads to longer stays in the hospital and higher mortality rates[2][3][4][5]. The recent COVID-19 health crisis enhanced the debate about ED crowding issues and promoted the initiative of care pathways, avoiding entry through the ED for elderly people as much as possible[6]. These initiatives are detailed in measure number 5 of the "Emergency reform pact", initiated in 2019 by the Ministry of Health in France[7]. Then, Unscheduled Direct Admissions (UDA) attracted increasing interest from public authorities, as illustrated by its systematic collection in the Program of Medicalization of the Information System (PMSI) starting from January 1st, 2022[8]. The UDA is a hospitalization without prior entry through the ED, requested by a medical doctor within 48 hours before the admission of patients coming from home or a medico-social establishment[9].

The UDA would have many advantages for patients and the healthcare system, such as better coordination between community medicine and hospital care, improved satisfaction for patients and caregivers, and reduced costs and flows in the ED[10][11]. Assessing the benefit of UDA is important to support the decision of its implementation, which will undoubtedly lead to reorganizing the healthcare system and require strong commitment from all the actors (general practitioners, hospital practitioners, etc.).

Few studies have assessed UDA, and their results are contradictory[10][12][13]. A study in the United States in 2012 showed higher mortality in unscheduled inpatients admitted directly for acute diseases such as sepsis or myocardial infarction, due to a delay in treatment[12]. For subacute diseases such as pneumonia, asthma, cellulitis, and other similar diseases, there were no differences in outcome for patients according to the type of admission[10]. In contrast, in two studies on childhood pneumonia, direct admission led to a reduction in costs of care without increasing transfers to intensive care or the risk of readmission[10][13]. Thus, the contradictory results on the benefit of UDA indicate the complexity of the issue and the need for additional studies, particularly for elderly people[14].

This work aimed to compare in-hospital mortality and the outcome at discharge of patients aged 75 and over during an unscheduled hospitalization, depending on their admission pathway, directly or after entry through the ED of Bordeaux University Hospital, between 2017 and 2019.

Methods

Study design and data source

This retrospective cohort study (from 2017 to 2019) was carried out using data from the PMSI and the Hospital Information System (SIH) of Bordeaux University Hospital[15]. The PMSI is a permanent, standardized, exhaustive collection of medical, administrative, and demographic data following hospitalization in a public or private hospital in France. Our study focused on hospital short-stay activities in Medicine, Surgery, and Obstetrics (MCO).

Patients included in this study were aged 75 and over, admitted to the geriatric department for unplanned hospitalization (after entry through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA)), and stayed at least one night between January 1st, 2017, and December 31st, 2019. For patients hospitalized several times in the geriatric department between 2017 and 2019, only their first hospitalization was included in the analysis. Figure A1 in Additional file 1 details the steps in selecting hospitalizations and patients.

The follow-up start date was the date of admission to the geriatric units or to the ED, depending on the patient pathway. The follow-up end date was the date of death or discharge. The follow-up period extended from January 1st, 2017, to December 31st, 2019.

Variables

The primary outcome was in-hospital mortality, while the secondary outcome was the modality of alive discharge defined as: (i) returning home (reference modality), (ii) transfer to a short-stay unit of another establishment, or (iii) transfer to a rehabilitation/long-stay care unit. The main variable of interest was the pathway of admission (UDA or EDA). Other explanatory variables included: age, sex, place of residence, the Activities of Daily Living (ADL) score, the Mini Mental State Examination (MMSE) score, the Elixhauser comorbidity assessment score[16][17][18][19], the main diagnostic at entry[20] (see Additional file 1, Table A5), and acute or chronic characteristics[21][22] (see Additional file 1, Table A6) based on International Classification of Diseases 10th revision (ICD10) code grouping, polypharmacy (drugs > 5), blood parameters (serum albumin, serum creatinine, hemoglobin), and the intervention of paramedical staff (physiotherapist, psychologist, social worker, dietician).

Statistical analysis

Chi-square or Fisher's exact tests were used for frequency comparisons, and the non-parametric Wilcoxon-Mann-Whitney test was used for mean comparisons. Six variables (ADL score, MMSE score, serum albumin, serum creatinine, hemoglobin, and polypharmacy) had between 0.5% and 27% missing data (Missing At Random (MAR) or Missing Completely At Random (MCAR))[23]. We used a multiple imputation method (30 imputed datasets) to mitigate bias related to missing data for these variables[24]. The survival analysis used the Fine and Gray competing risk approach to take into account the large number of censored patients who were discharged alive.

The association between the type of admission and in-hospital mortality was explored using a proportional hazard model[25]. The associations between the type of admission and the modality of discharge alive were analyzed using a multinomial logistic regression model after excluding deceased patients. The models were adjusted for variables selected from the literature and by a step-by-step downward method. The variables selected by the literature included the five most frequent groups of diseases at admission (cardiovascular, pulmonary, gastroenterological, hematological, and neurological), the acute or chronic nature of the diagnosis, the Elixhauser comorbidity score, serum albumin, serum creatinine, and hemoglobin.

The data were extracted with SAS Enterprise Guide® software version 8.3, and the statistical analysis was performed with R software version 4.1.3 (packages *miceadds, mfp, mice, survminer, survival, cmprsk, generalhoslem*). This study was approved by the Institutional Review Board (IRB) of Bordeaux University Hospital.

Results

Patient selection and characteristics

Among the 3,021 patients aged 75 and over hospitalized at least once in geriatrics between 2017 and 2019, 605 (20%) patients with a scheduled admission were excluded from the analysis. Regarding the remaining 2,416 patients hospitalized as an unscheduled admission, 1,747 (72%) patients were admitted after entry through the ED (EDA-patients), and 669 (28%) were admitted directly (UDA-patients) (Figure 1).

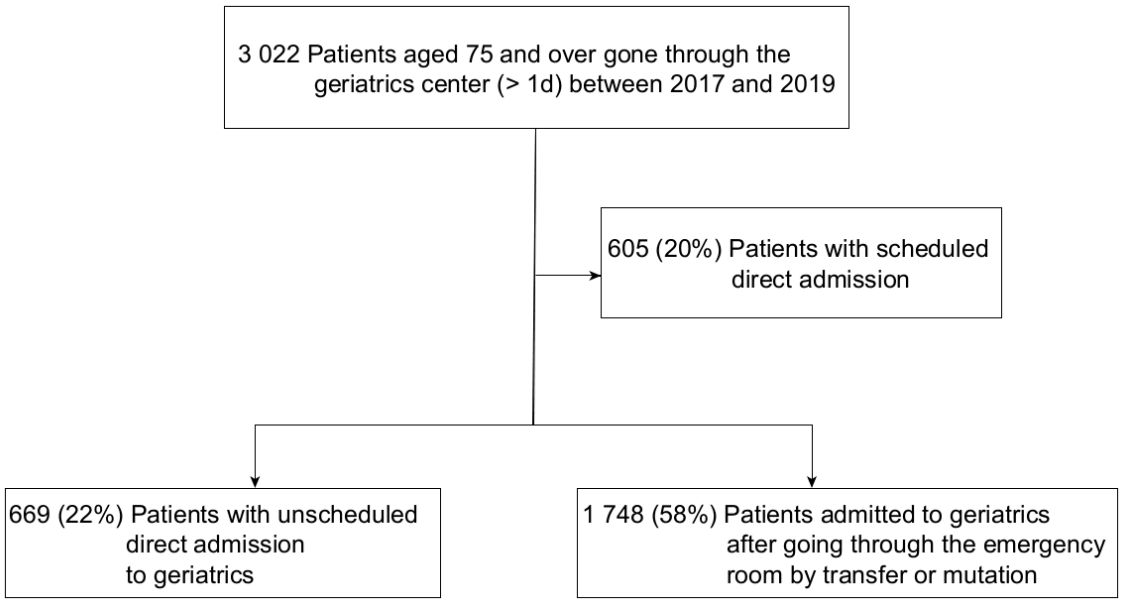

Figure 1. Flow chart of the study population of people aged 75 and over admitted to geriatrics.

People admitted to geriatrics either through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA), Bordeaux University Hospital, 2017-2019.

The mean age was lower for UDA patients (86.9 vs 87.7; p=0.002) (Table 1). The sex ratios were comparable between the two groups, and the majority of UDA patients lived outside the Bordeaux metropole area (83% vs 86%; p=0.03). UDA patients had higher albumin levels (34.4 g/L vs 32.5 g/L; p<0.0001); lower creatinine levels (88.5 µmol/L vs 98.3 µmol/ L; p<0.0001); and lower hemoglobin levels (11.7 g/dL vs 12.3 g/dL; p<0.0001). The ADL dependency score was lower in UDA patients (1.1 vs 2.9; p<0.0001), as was the Elixhauser comorbidity index (14.3 vs 16.0; p< 0.0001). Neurological diseases were the most frequent comorbidities in both groups, accounting for 24% of UDA patients and 30% of EDA patients. UDA patients had significantly more cardiovascular, hematological, nephrological, neurological, orthopedic, and psychiatric diseases at admission. However, they had fewer acute diseases at admission (43% vs 79% among EDA patients).

Characteristics		EDA (n =1 747)		UDA (n = 669)		p-value
Sociodemographics						
Age in years, mean. (SD)		87.7 (5.6)		86.9 (5.7)		0.002
Age groups, n (%)						0.12
75 ≤ age < 85		507 (28.0)		194 (32.0)		
85 ≤ age < 95		1 057 (61.0)		405 (59.0)		
95 ≤ age		183 (11.0)		70 (9.0)		
Sex, men, n (%)		669 (38.0)		233 (35.0)		0.11
Home in CUB[1], n (%)		1 512 (86.0)		555 (83.0)		0.03
Biological and clinical						
Biology, mean. (SD)						
Serum albumin (g/L)[5]		32.5 (6.9)		34.4 (8.5)		<0.001
Serum creatinine (µmol/L)[6]		98.3 (70.6)		88.5 (63.6)		<0.001
Hemoglobin (g/dL)[7]		12.3 (2.1)		11.7 (2.0)		<0.001
Polypharmacy[2], n (%)		854.0 (63.0)		362 (68.0)		0.05
Scores and Index, mean (SD)						
ADL[3]		2.9 (2.2)		1.1 (1.8)		<0.001
MMSE[4]		17.6 (6.9)		17.0 (7.3)		0.16
Elixhauser		16.0 (9.2)		14.3 (9.3)		<0.001
*Admission comorbidities, n (%)**						
Cardiovascular		223 (1.0)		59 (9.0)		0.007
Dermatological		33 (2.0)		16 (2.0)		0.4
Endocrinological		15 (0.9)		9 (1.0)		0.3
Gastroenterology		115 (7.0)		55 (8.0)		0.16

Characteristics		EDA (n =1 747)		UDA (n = 669)		p-value
Hematological		62 (4.0)		78 (12.0)		<0.001
Infectious		32 (2.0)		15 (2.0)		0.5
Nephrological		154 (9.0)		30 (4.0)		<0.001
Neurological		528 (30.0)		161 (24.0)		0.003
Orthopedic		79 (5.0)		13 (2.0)		0.003
Pulmonary		251 (14.0)		78 (12.0)		0.09
Psychiatric		50 (3.0)		57 (9.0)		<0.001
Rheumatological		119 (7.0)		33 (5.0)		0.09
Urological		60 (3.0)		24 (4.0)		0.9
Character of diseases, n (%)						<0.001
Acute		1 373 (79.0)		289 (43.0)		
Chronic		218 (12.0)		291 (42.0)		
Indeterminate		157 (9.0)		89 (13.0)		
Hospitalizations						
Length of stay in days, mean (SD)		15.9 (11.66)		14.3 (10.35)		<0.001
Paramedics. n (%)						
Dietician		236 (14.0)		63 (9.0)		0.006
Social worker		1 269 (73.0)		410 (61.0)		<0.001
Physiotherapy		906 (52.0)		360 (54.0)		0.41
Psychological		112 (6.0)		54 (8.0)		0.15
State after hospitalization						
In-hospital death, n (%)		175 (10.0)		69 (10.0)		0.83
Discharge excluding death, n (%)						<0.001
Returning home		1 184 (75.0)		499 (83.0)		

Characteristics		EDA (n =1 747)		UDA (n = 669)		p-value
Rehabilitation/long-stay		266 (17.0)		57 (10.0)		
Short stay of another hospital		109.0 (7.0)		40 (7.0)		
Others**		13 (1.0)		4 (1.0)		

Table 1. Characteristics of people aged 75 and over admitted to geriatrics. People admitted to geriatrics either through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA) at the Bordeaux University Hospital between 2017-2019

SD: Standard Error; ADL: Activities of Daily Living; MMSE: Mini-Mental State Examination; UDA: Unscheduled Direct Admission; EDA: Admission through the Emergency Department

[1] *Residents of the Metropole of Bordeaux*

[2] *397 (23%) missing data points for EDA and 137 (20%) missing data points for UDA*

[3] *94 (5%) missing data points for EDA and 22 (3%) missing data points for UDA*

[4] *503 (29%) missing data points for EDA and 143 (21%) missing data points for UDA*

[5] *172 (10%) missing data points for EDA and 90 (13%) missing data points for UDA*

[6] *13 (2%) missing data points for UDA*

[7] *16 (1%) missing data points for UDA*

** Terms not mutually exclusive*

*** Detail of the modality Others: Psychiatry unit, home hospitalization health establishments, medico-social accommodation structure, Home Care Nursing Service (HNIS)*

The length of stay was significantly shorter on average for UDA-patients compared to EDA-patients (14.3 vs 15.9; p=0.0004) (Table 1). This result was confirmed by an additional multivariate linear regression analysis (see Additional file 1, Table A1).

During their hospitalization, EDA-patients had more often contact with dieticians (14% vs. 9% for UDA-patients, p=0.006) or social workers (73% vs. 61%, p<0.0001).

Admission Pathways and in-hospital mortality

The cumulative in-hospital death rate was not significantly different between the two groups (10% for both UDA-patients and EDA-patients) (Table 1). Between 0 and 20 days, UDA-patients had a lower but non-

significant cumulative incidence of death compared to EDA-patients (Figure 2).

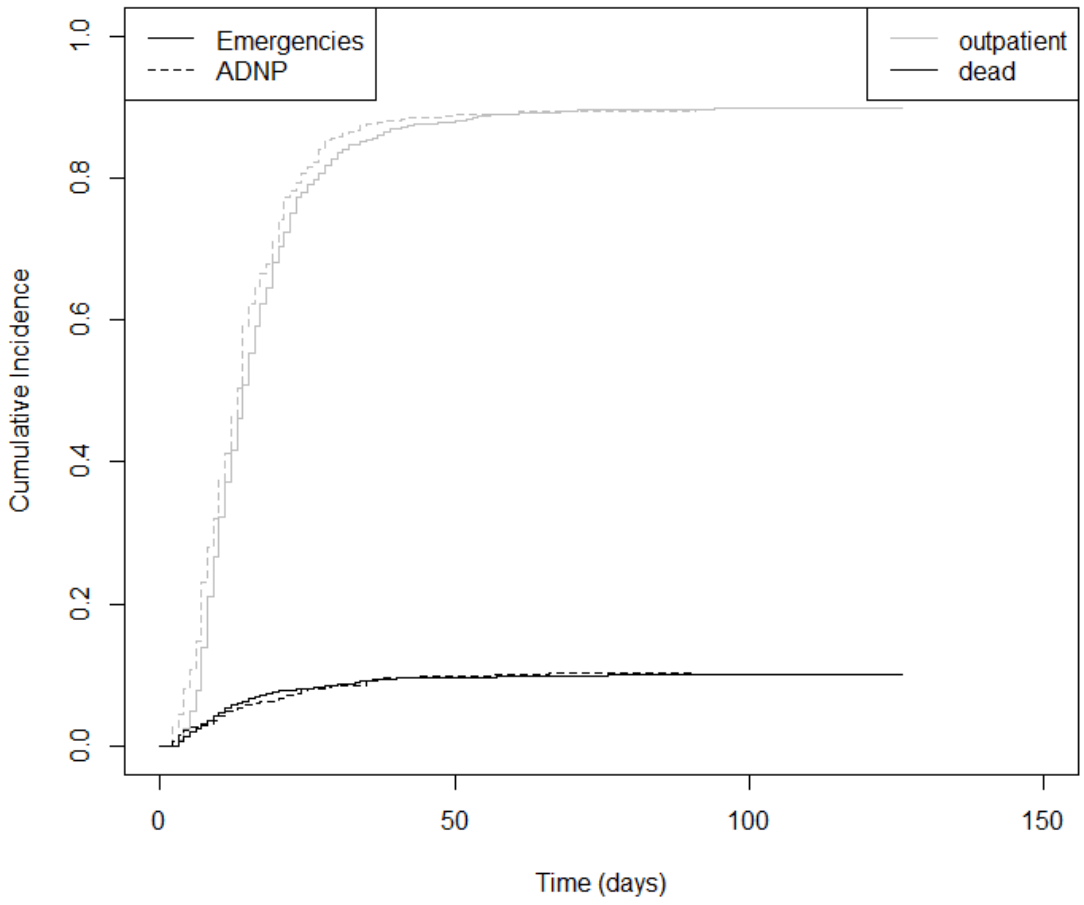

Figure 2. Cumulative incidence of deaths and live discharges of people admitted to geriatrics.

People aged 75 and over admitted to geriatrics either through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA), Bordeaux University Hospital, 2017-2019.

The dotted curves represent patients admitted as an Unscheduled Direct Admission (UDA), and the solid curves represent patients admitted through the Emergency Department (EDA). The gray curves represent the cumulative incidence of live discharge, and the black curves represent the cumulative incidence of in-hospital death.

In the overall population, the risk of mortality was not significantly different for UDA-patients compared to EDA-patients in the unadjusted (HR: 1.19, 95% CI [0.90;1.57]) and the adjusted analysis (HR: 1.00, 95% CI [0.54;1.85]). Analysis in sub-populations based on pre-existing diseases at admission showed similar results (Table 2).

CHARACTERISTICS	Unadjusted Model			Adjusted Model*		
	HR	CI 95%	p-value	HR	CI 95%	p-value
Global population analysis						
Mode of entry						
EDA	Ref.	Ref.		Ref.	Ref.	
UDA	1.19	(0.90; 1.57)	0.23	1.00	(0.54; 1.85)	0.99
Analysis by subgroups of pre-existing diseases at admission						
Cardiaovascular (UDA vs EDA)	0.88	(0.39; 2.01)	0.77	1.08	(0.36; 3.24)	0.89
Gastroenterological (UDA vs EDA)	0.27	(0.06; 1.17)	0.08	0.31	(0.07; 1.43)	0.14
Hematological (UDA vs EDA)	1.71	(0.58; 5.00)	0.33	1.39	(0.43; 4.52)	0.59
Neurological (UDA vs EDA)	1.31	(0.69; 2.51)	0.41	0.89	(0.38; 2.06)	0.78
Pulmonary (UDA vs EDA)	1.47	(0.85; 2.56)	0.17	1.33	(0.72; 2.45)	0.36
Chronic (UDA vs EDA)	1.56	(0.87; 2.83)	0.14	1.21	(0.52; 2.80)	0.66
Indeterminate** (UDA vs EDA)	0.68	(0.53; 1.69)	0.40	1.15	(0.31; 4.33)	0.84

Table 2. Comparison of mortality in people aged 75 and over admitted to geriatrics. People admitted to geriatrics either through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA), the University Hospital, 2017-2019 – Global and subgroup analyses according to underlying conditions at admission

HR: Hazard Ratio, CI 95%: 95% Confidence Interval, Ref.: Reference, UDA: Unscheduled Direct Admission

EDA: Admission through the Emergency Department

** Model was adjusted on the following variables: age, ADL score, MMSE score, dietitian intervention, social worker intervention, physiotherapist intervention, psychologist intervention, serum albumin, serum creatinine, hemoglobin, Elixhauser score, polypharmacy, cardiovascular diseases, gastroenterological diseases, dermatological diseases, hematological diseases, nephrological diseases, neurological diseases, orthopedic diseases, pulmonary diseases, psychiatric diseases, rheumatological diseases, acute diseases, chronic diseases, and indeterminate diseases.*

*** Indeterminate diseases both not chronic and not acute*

doi.org/10.32388/4NX68G

Admission Pathways and modalities of discharge alive

The modalities of discharge alive were significantly different between the two groups, with more home discharges for UDA patients (83% vs 75% for EDA), and more transfers to rehabilitation/long-stay care for EDA patients (17% vs 10% for UDA) (Table 1).

In the overall analysis, UDA-patients and EDA-patients did not differ significantly in terms of transfer to short-stay units of another hospital or rehabilitation/long-stay care compared to those who returned home. With the return home as the reference, the Odds Ratio (OR) of transfer to short-stay units for UDA-patients compared to EDA-patients was 0.64 (95% CI [0.28;1.47]) (Figure 3). The OR of transfer to rehabilitation/long-stay care in UDA-patients compared to EDA-patients was 0.91 (95% CI [0.52;1.61]). Analysis of the sub-population of patients with hematological diseases at admission revealed a significantly lower risk of transfer to rehabilitation/long-term care among UDA-patients compared with EDA-patients (OR = 0.10; 95% CI [0.01;0.88]) (See Additional file 1, Table A3).

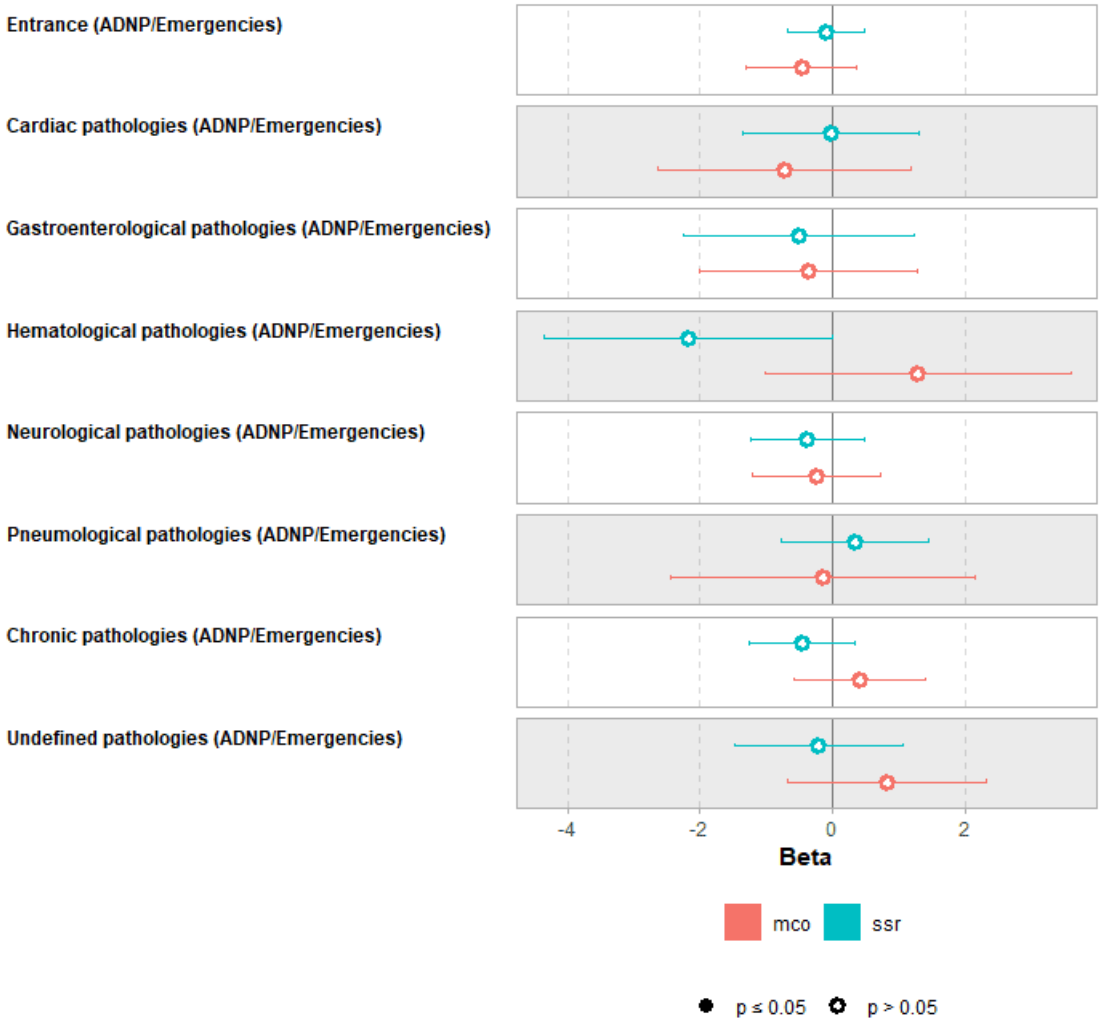

Figure 3. Odds Ratio (OR) of different explanatory variables adjusted for other parameters in the logistic models. The two logistic models are a multinomial model for people aged 75 and over admitted to geriatrics either through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA), Bordeaux University Hospital, 2017-2019 (Final model– Multi-variable analysis).

* Indeterminate diseases, both not chronic and not acute.

Discussion

Our study showed that UDA-patients in geriatrics at the Bordeaux University Hospital were younger, had fewer acute diseases, and had shorter lengths of hospital stay. In multivariate analyses, UDA-patients had comparable outcomes to EDA-patients at the end of their stay in terms of in-hospital mortality and alive discharge to their home or to other health establishments. Analysis in subgroups of patients according to comorbidities at admission also did not show differences in in-hospital mortality between UDA-patients and EDA-patients.

The UDA-patients differed from those admitted through the ED in terms of admission reasons and age. More precisely, UDA-patients had fewer acute diseases at admission, which is consistent with this type of admission, suitable for subacute diseases[26]. Moreover, the younger age of UDA-patients in our study is consistent with the higher proportion of patients without disabilities found in United States (US) and French studies, reflecting similar profiles of UDA-patients[14][26][27]. Adjustment of the models for age, diseases at admission, and acute or chronic nature maximized the comparability of the groups in our study.

EDA-patients logically had a longer hospital stay than UDA-patients, and our results are similar to those of other studies[27][28]. Thus, the association of UDA with a significant reduction in the length of stay reinforces the incentives for its development. It would additionally strengthen "community-hospital care" links and limit the ED waiting time, which is associated with a higher risk of complications, especially among elderly people[2]. The UDA is a reliable alternative pathway to admission through the ED, and it could help overcome the consequences of ED overcrowding, such as the night closures of the ED during the summer of 2022 in France[29]. Another advantage of UDA would be to limit inter-department transfers, especially from the ED, which can cause stress to patients and increase the likelihood of medical errors[30][31]. The development of UDA will require strengthening the link between community medicine and hospital care by: (i) improving the training and communication between actors; (ii) reorganizing the patient's care pathway; and (iii) ensuring the strong involvement of families[32]. The involvement of families illustrates the importance of the social environment, which could increase the length of stay when caregivers or technical aids at home are needed[33][34]. Ultimately, the UDA should reduce hospitalization delays.

In contrast to our study, a 2013 study in the United States, which encompassed a wide variety of diseases at admission, revealed a significantly higher mortality rate in UDA-patients in their overall analysis[27]. In our study, we observed a lower mortality rate in UDA-patients in a small sample of patients hospitalized for hematological conditions. Studies focusing on specific diseases have shown contrasting results, such as a US study demonstrating the benefit of EDA for managing sepsis[12]. Thus, UDA seems less suitable for acute diseases. However, we found no significant difference in in-hospital mortality between patients with acute and chronic diseases at admission. This result should be interpreted with caution because the ICD-10 diagnosis codes at admission were not always informative for differentiating acute and chronic diseases.

In our global analysis, UDA-patients did not differ from EDA-patients in terms of transfer to short-stay units or rehabilitation/long-stay care compared to those who returned home. In contrast, UDA-patients with hematological disease appeared to be transferred less frequently to short-stay units or rehabilitation/long-stay care. Even if this sub-population was already identified in the study by Kocher KE et al, our findings would require confirmation in a larger sample[27].

Our study has several limitations. First, despite the extension of the inclusion period to three years, the sample size was small in some subgroups of diseases. Our choice to regroup diseases at admission by major anatomical organs partly limits this problem of sample size for the most frequent diseases. In addition, to account for the imbalance between UDA and EDA regarding groups of diseases such as cardiovascular diseases, we included the acute or chronic nature of the diseases in our models. Second, UDA patients were identified with keywords in the absence of a structured variable in the information system before January 2022. This method of keyword research could have induced classification bias, which we minimized by complete beforehand expertise of a large number of medical files for the selection of the keywords used. Third, some biological data had a significant number of missing values. The use of all the data by implementing a multiple imputation algorithm allowed us to limit the risk of bias. Finally, this study was conducted in a single university hospital and included only patients aged 75 and over, which may limit the generalizability of the findings to other healthcare settings or younger populations.

Conclusion

We did not find significant differences in terms of mortality and outcomes at discharge from hospitalization between unscheduled patients admitted directly to geriatrics and those admitted after entry through the ED. The unscheduled direct admission pathway seems suitable for patients with subacute diseases at admission, with the advantage of a shorter length of stay and therefore a reduction in nosocomial risks.

These findings suggest that UDA may represent a viable alternative to admission through the Emergency Department for certain elderly patients, though further studies are needed to confirm its benefits and guide implementation. These further studies should help specify the organizational aspects in the deployment of Unscheduled Direct Admission (UDA), emphasizing the necessity to build pathways that strongly involve both community medicine and hospital care actors.

Supplementary Material

Additional file 1 (PDF)

List of Tables

Table A1. Comparison of length of stay in people aged 75 and over admitted to geriatrics either through the Emergency Department (EDA) or as an Unscheduled Direct Admission (UDA), Bordeaux University Hospital, 2017-2019 – Global and subgroup analyses according to underlying conditions at admission.

List of Figures

Statements and Declarations

Funding

This research did not receive any funding from agencies in the public, commercial, or not-for-profit sectors.

Conflicts of Interest

The authors have no conflicts

Ethics approval and consent to participate

This study was approved by the Institutional Review Board of the Bordeaux Center for Ethics and Health Research (CER-BDX 2024-229). Informed consent was not required as the data were fully anonymized and collected retrospectively in accordance with French regulations.

References

1. ^"*Le paradoxe des services d'urgence durant la crise du Covid-19." Revue Medicale Suisse. (2022). https://www.revmed.ch/revue-medicale-suisse/2020/revue-medicale-suisse-693/le-paradoxe-des-services-d-urgence-durant-la-crise-du-covid-19.*
2. ^a, ^b*Singer AJ, Thode HC, Viccellio P, Pines JM (2011). "The association between length of emergency department boarding and mortality." Acad Emerg Med. 18:1324–9.*
3. ^*Beczek A, Vámosi M (2022). "Prevalence of Prolonged Length of Stay in an Emergency Department in Urban Denmark: A Retrospective Health Records Repository Review." J Emerg Nurs. 48:102.e1–102.e12.*
4. ^*Chong CP, Haywood C, Barker A, Lim WK (2013). "Is Emergency Department length of stay associated with inpatient mortality?" Australasian Journal on Ageing. 32:122–4.*
5. ^*Liew D, Liew D, Kennedy MP (2003). "Emergency department length of stay independently predicts excess inpatient length of stay." Medical Journal of Australia. 179:524–6.*
6. ^"*Concertation pour les personnes âgées." solidarites-sante.gouv.fr. (2022). https://solidarites-sante.gouv.fr/archives/consultation-place-des-personnes-agees/concertation-grand-age-et-autonomie/.*
7. ^"*Pacte de refondation des urgences." nouvelle-aquitaine.ars.sante.fr. (2022). https://www.nouvelle-aquitaine.ars.sante.fr/pacte-de-refondation-des-urgences-3.*
8. ^"*Parcours d'admissions directes non programmées des personnes âgées en établissement de santé." hauts-de-france.ars.sante.fr. (2022). https://www.hauts-de-france.ars.sante.fr/parcours-dadmissions-directes-non-programmees-des-personnes-agees-en-etablissement-de-sante.*

9. ^Holla H (2021). "Admissions directes non programmées des patients de 75 ans et plus (ADNP75) ; Notice technique n° ATIH-682-13-2021 du 07 décembre 2021." ATIH. p. 5.
10. a, b, c, dLeyenaar JK, O'Brien E, Malkani N, Lagu T, Lindenauer PK (2016). "Direct admission to hospital: a mixed methods survey of pediatric practices, benefits and challenges." Acad Pediatr. 16:175–82.
11. ^Aizen E, Swartzman R, Clarfield AM (2001). "Hospitalization of nursing home residents in an acute-care geriatric department: direct versus emergency room admission." Isr Med Assoc J. 3:734–8.
12. a, b, cPowell ES, Khare RK, Courtney DM, Feinglass J (2012). "Lower mortality in sepsis patients admitted through the ED vs direct admission." The American Journal of Emergency Medicine. 30:432–9.
13. a, bLeyenaar JK, Shieh M-S, Lagu T, Pekow PS, Lindenauer PK (2014). "Variation and outcomes associated with direct hospital admission among children with pneumonia in the United States." JAMA Pediatr. 168:829–36.
14. a, bNeouze A, Dechartres A, Legrain S, Raynaud-Simon A, Gaubert-Dahan M-L, Bonnet-Zamponi D (2012). "[Hospitalization of elderly in an acute-care geriatric department]." Geriatr Psychol Neuropsychiatr Vieil. 10:143–50.
15. ^Gilleron V, Esposito V, Sibe M (2018). "Concilier une activité multisite et une production de données médicales homogène et fiable : L'expérience du DIM du CHU de Bordeaux." Gestions Hospitalières.
16. ^Cai M, Liu E, Zhang R, Lin X, Rigdon SE, Qian Z, et al. (2020). "Comparing the Performance of Charlson and Elixhauser Comorbidity Indices to Predict In-Hospital Mortality Among a Chinese Population." Clin Epidemiol. 12:307–16.
17. ^Menendez ME, Neuhaus V, van Dijk CN, Ring D (2014). "The Elixhauser comorbidity method outperforms the Charlson index in predicting inpatient death after orthopaedic surgery." Clin Orthop Relat Res. 472:2878–86.
18. ^Elixhauser A, Steiner C, Harris DR, Coffey RM (1998). "Comorbidity Measures for Use with Administrative Data." Medical Care. 36:8.
19. ^Quail JM, Lix LM, Osman BA, Teare GF (2011). "Comparing comorbidity measures for predicting mortality and hospitalization in three population-based cohorts." BMC Health Serv Res. 11:146.
20. ^Ouattara E, Bruandet A, Borde A, Tezenas du Montcel S, Gilleron V, de travail COVIDIM G (2022). "Facteurs de risque de mortalité chez des patients COVID-19 hospitalisés avec ou sans passage en soins critiques - Etude nationale COVIDIM." Revue d'Épidémiologie et de Santé Publique. 70:S17–8.
21. ^Fry M, Fitzpatrick L, Considine J, Shaban RZ, Curtis K (2018). "Emergency department utilisation among older people with acute and/or chronic conditions: A multi-centre retrospective study." International Emergency Nursing. 37:39–43.
22. ^Buurman BM, Frenkel WJ, Abu-Hanna A, Parlevliet JL, de Rooij SE (2016). "Acute and chronic diseases as part of multimorbidity in acutely hospitalized older patients." European Journal of Internal Medicine. 27:68–75.
23. ^"sec-idconcepts.html." stefvanbuuren.name. (2022). https://stefvanbuuren.name/fimd/sec-idconcepts.html.

24. ^White IR, Royston P, Wood AM (2011). "Multiple imputation using chained equations: Issues and guidance for practice." Statistics in Medicine. 30:377–99.

25. ^Joly P, Alioum A, Commenges D, Jacqmin-Gadda H, Leffondré K, Le Goff M, Proust-Lima C (2021). Master Sciences, Technologies, Santé, Mention Santé Publique 2021-2022. Méthodes d'analyses de données de survie. Bordeaux: Université de Bordeaux, ISPED.

26. a, bCarratalà J, Fernández-Sabé N, Ortega L, Castellsagué X, Rosón B, Dorca J, et al. (2005). "Outpatient Care Compared with Hospitalization for Community-Acquired Pneumonia." Ann Intern Med. 142:165–72.

27. a, b, c, dKocher KE, Dimick JB, Nallamothu BK (2013). "Changes in the source of unscheduled hospitalizations in the United States." Med Care. 51:689–98.

28. ^Vermeersch T, Lambert C, Jouve É, Joyon C, Bohatier J, Lahaye C (2022). "Comparaison de la durée moyenne de séjour des patients hospitalisés dans le service de court séjour gériatrique en entrée directe ou via les urgences après régulation par la ligne téléphonique dédiée." Gériatrie et Psychologie Neuropsychiatrie du Vieillissement. 20:311–8.

29. ^"Les urgences de Bordeaux contraintes de filtrer les patients." LEFIGARO. (2022). https://www.lefigaro.fr/sciences/les-urgences-de-bordeaux-contraintes-de-filtrer-les-patients-20220524.

30. ^Kulshrestha A, Singh J (2016). "Inter-hospital and intra-hospital patient transfer: Recent concepts." Indian J Anaesth. 60:451–7.

31. ^Kripalani S, LeFevre F, Phillips CO, Williams MV, Basaviah P, Baker DW (2007). "Deficits in Communication and Information Transfer Between Hospital-Based and Primary Care Physicians: Implications for Patient Safety and Continuity of Care." JAMA. 297:831–41.

32. ^Braet A, Weltens C, Sermeus W (2016). "Effectiveness of discharge interventions from hospital to home on hospital readmissions: a systematic review." JBI Database System Rev Implement Rep. 14:106–73.

33. ^Menand E, Lenain E, Lazarovici C, Chatellier G, Saint-Jean O, Somme D, et al. (2015). "French multicenter evaluation of the appropriateness of admission to the emergency department of the over-80s." J NUTR HEALTH AGING. 19:681–7.

34. ^Di Iorio A, Longo A, Mitidieri Costanza A, Palmerio T, Bcnvenuti E, Giardini S, et al. (1999). "Factors related to the length of in-hospital stay of geriatric patients." Aging Clin Exp Res. 11:150–4.

Supplementary data: available at https://doi.org/10.32388/4NX68G

Declarations

Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.