European Journal of Internal Medicine xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

European Journal of Internal Medicine

journal homepage: www.elsevier.com/locate/ejim

Letter to the Editor

Association between presenting complaints of acutely admitted medical patients and mortality: A cohort study

ARTICLE INFO

Keywords:
Complaints
Mortality
Acutely admitted

Dear Editor,

In 2012, more than 1 million patients were acutely admitted to Danish hospitals, [1] accounting for 76% of all admitted patients. From 2006 to 2012 the number of acute admissions in Denmark increased by 15%; this appears to be an international trend. [2] The recognition and interpretation of the symptoms leading to admission are the first and crucial steps in acute care settings and represent important parts of assessing the medical history. However, previous studies have shown that symptoms and complaints also contain prognostic information. For instance, Safwenberg et al. have shown in Swedish data that both in-hospital and long-term mortality differ with presenting symptoms. [3] In this letter we describe the demographics and prognostic influence of primary complaints in an acute medical unit (AMU). The aim is 1) to present information on presenting complaints of acutely admitted medical patients and 2) to present the association between presenting complaint and mortality.

This was a prospective cohort study of acutely admitted adult medical patients. The study was approved by the Danish Data Protection Agency (file no. 2008–58-0035) and the National Board of Health (file no. 3–3013-1281/1). By Danish law, registry studies are exempt from approval by the ethics committee. The study will be presented according to the STROBE criteria [5]. Data was collected at the Hospital of South West Jutland, a 450-bed regional teaching hospital. All subspecialties of internal medicine are present as well as a 12 bed level two intensive care unit. The hospital has a contingency population of approximately 220,000. Upon arrival, a member of the nursing staff and a junior physician initially saw all patients. All patients arriving to the AMU from 1 June to 31 October 2012 were included. A study nurse trained in triage extracted the presenting complaint from (in prioritized order) either the patient, department register, nurse's notes or the electronic medical records. In case of multiple complaints, the dominant complaint, based on the nurse's clinical judgment, was used. Patients without a Danish personal registration number were excluded as follow-up would not be complete. [4]

After inclusion of all patients, two of the authors (MKN and MB) analysed the complaints list. Obvious related complaints were combined into a single group (e.g. fainting and syncope). In case of disagreement, this was resolved through discussion. In order of gaining statistical power, we only included primary complaints with more than 150 contacts within the study period. To evaluate the reliability of the sampling of primary complaints, a random selection of 220 contacts was taken, and a second study nurse reviewed all sources (except direct contact with the patient) and extracted a second opinion on primary complaint. There was an excellent agreement between the two study nurses, $\kappa = 0.763$ (95% CI 0.704–0.825).

After discharge, we extracted data from the national patient registry on length of stay, transfers to other departments (including intensive care) and hospitals, final discharge diagnoses and co-morbidity [1]. We extracted mortality data from the civil registration register, with complete follow-up on all Danish inhabitants [4]. If a patient had more than one contact during the observation period, only the first contact was used when calculating mortality. Our primary endpoint was the distribution of primary complaints. Secondly, we present data on 0–7 day mortality, regardless of cause and discharge status and thirdly on mortality at 8–30 and 31–365 days.

Data will be presented descriptively with continuous data as median (interquartile range) and categorical data as proportion (95% confidence interval [CI]). The association between endpoint and primary complaint will be analysed using logistic regression both as unadjusted analysis and adjusted for age, sex and co-morbidity according to the Charlson co-morbidity index [6], and only including the first contact within a specific primary complaint. To assess the complexity of each primary complaint, we calculated the number of different main discharge diagnoses per symptom according to the ICD-10 system using the first three digits (e.g. J18).

A total of 5965 contacts were registered. Of these 5776 had available data from the national patient registry and formed the basis for the study. The patients presented with 213 different primary complaints before combining individual symptoms into broader groups. Seventy-seven per cent of all contacts were caused by one of 13 distinct complaints. The most common complaints were dyspnoea (16.2%), chest pain (15.3%), confusion (7.4%) and dizziness (6.5%). Together these four complaints covered nearly half of the admissions. Patients were

https://doi.org/10.1016/j.ejim.2018.06.011
Received 12 June 2018; Accepted 13 June 2018

Table 1
– Baseline characteristics and prognostic data of included patients.

	Total	General disability	Stroke-like symptoms	Swollen extremity	Fever	Headache	Confusion	Pain in extremity	Syncope	Dizziness	Intoxication	Palpitations	Dyspnea	Chest pain	Other
Number, %	5776 (100.0%)	226 (3.9%)	206 (3.6%)	193 (3.3%)	213 (3.7%)	188 (3.3%)	430 (7.4%)	250 (4.3%)	188 (3.3%)	378 (6.5%)	198 (3.4%)	161 (2.8%)	935 (16.2%)	884 (15.3%)	1326 (23.0%)
Demographic data															
Age, median (IQR)	67 (49–78)	77 (66–84)	67 (53–80)	67 (52–77)	67 (51–78)	48.5 (36–65.5)	73 (61–82)	60 (45–72)	67 (49.5–79)	69 (55–79)	34 (21–49)	62 (50–72)	72 (62–81)	62 (49–74)	67 (47–80)
Gender															
Male (%)	2914 (50.5%)	106 (46.9%)	111 (53.9%)	101 (52.3%)	125 (58.7%)	64 (34.0%)	211 (49.1%)	118 (47.2%)	87 (46.3%)	177 (46.8%)	94 (47.5%)	85 (52.8%)	450 (48.1%)	508 (57.5%)	677 (51.1%)
Female (%)	2862 (49.5%)	120 (53.1%)	95 (46.1%)	92 (47.7%)	88 (41.3%)	124 (66.0%)	219 (50.9%)	132 (52.8%)	101 (53.7%)	201 (53.2%)	104 (52.5%)	76 (47.2%)	485 (51.9%)	376 (42.5%)	649 (48.9%)
Charlson comorbidity index															
Low (score 0) (%)	2455 (42.5%)	53 (23.5%)	105 (51.0%)	95 (49.2%)	67 (31.5%)	120 (63.8%)	140 (32.6%)	123 (49.2%)	105 (55.9%)	165 (43.7%)	141 (71.2%)	109 (67.7%)	216 (23.1%)	441 (49.9%)	575 (43.4%)
Medium (score 1) (%)	1967 (34.1%)	87 (38.5%)	68 (33.0%)	67 (34.7%)	77 (36.2%)	53 (28.2%)	147 (34.2%)	81 (32.4%)	65 (34.6%)	139 (36.8%)	40 (20.2%)	37 (23.0%)	410 (43.9%)	295 (33.4%)	401 (30.2%)
High (score 2+) (%)	1354 (23.4%)	86 (38.1%)	33 (16.0%)	31 (16.1%)	69 (32.4%)	15 (8.0%)	143 (33.3%)	46 (18.4%)	18 (9.6%)	74 (19.6%)	17 (8.6%)	15 (9.3%)	309 (33.0%)	148 (16.7%)	350 (26.4%)
Prognostic data															
ICU admission, n (%) [95%CI])	138 (2.4, [2.0–2.8])	6 (2.7, [1.0–5.7])	10 (4.9, [2.4–8.7])	2 (1.0, [0.1–3.7])	6 (2.8, [1.0–6.0])	3 (1.6, [0.3–4.6])	21 (4.9, [3.0–7.4])	1 (0.4, [0.0–2.2])	2 (1.1, [0.1–3.8])	8 (2.1, [0.9–4.1])	8 (4.0, [1.8–7.8])	0 (0.0, [0.0–2.3])	30 (3.2, [2.2–4.5])	10 (1.1, [0.5–2.1])	31 (2.3, [1.6–3.3])
Dead within 7 days, n (%) [95%CI])	111 (1.9, [1.6–2.3])	5 (2.2, [0.7–5.1])	1 (0.5, [0.0–2.7])	0 (0.0, [0.0–1.9])	6 (2.8, [1.0–6.0])	2 (1.1, [0.1–3.8])	26 (6.0, [4.0–8.7])	4 (1.6, [0.4–4.0])	1 (0.5, [0.0–2.9])	3 (0.8, [0.2–2.3])	0 (0.0, [0.0–1.8])	0 (0.0, [0.0–2.3])	37 (4.0, [2.8–5.4])	3 (0.3, [0.1–1.0])	23 (1.7, [1.1–2.6])
Dead within 30 days, n (%) [95%CI])	171 (3.0, [2.5–3.4])	10 (4.4, [2.1–8.0])	10 (4.9, [2.4–8.7])	4 (2.1, [0.6–5.2])	9 (4.2, [2.0–7.9])	0 (0.0, [0.0–1.9])	28 (6.5, [4.4–9.3])	1 (0.4, [0.0–2.2])	1 (0.5, [0.0–2.9])	6 (1.6, [0.6–3.4])	2 (1.0, [0.1–3.6])	0 (0.0, [0.0–2.3])	56 (6.0, [4.6–7.7])	6 (0.7, [0.2–1.5])	38 (2.9, [2.0–3.9])
Dead within 1 year, n (%) [95%CI])	742 (12.8, [12.0–13.7])	72 (31.9, [25.8–38.4])	27 (13.1, [8.8–18.5])	17 (8.8, [5.2–13.7])	33 (15.5, [10.9–21.1])	8 (4.3, [1.9–8.2])	82 (19.1, [15.5–23.1])	13 (5.2, [2.8–8.7])	7 (3.7, [1.5–7.5])	27 (7.1, [4.8–10.2])	7 (3.5, [1.4–7.1])	1 (0.6, [0.0–3.4])	214 (22.9, [20.2–25.7])	46 (5.2, [3.8–6.9])	188 (14.2, [12.3–16.2])
Length of stay, median (IQR)	1 (0–5)	4 (1–7)	3 (1 −10)	1 (0–2)	4 (2–7)	1 (0–2)	2 (1–6)	0.5 (0–1)	1 (1–2.5)	1 (0–3)	1 (0–1)	1 (0–1)	3 (1–6)	1 (0–3)	1 (1–5)
Crude OR for 7 day mortality (95% CI)		1.2 (0.5–2.9)	0.2 (0.0–1.7)		1.5 (0.7–3.5)	0.5 (0.1–2.2)	4.0 (2.5–6.3)	0.8 (0.3–2.3)	0.3 (0.0–1.9)	0.4 (0.1–1.2)			2.7 (1.8–4.0)	0.2 (0.0–0.5)	0.9 (0.6–1.4)
Crude OR for 30 day mortality (95% CI)		1.5 (0.8–3.0)	1.7 (0.9–3.3)	0.7 (0.3–1.9)	1.5 (0.7–2.9)		2.5 (1.7–3.8)	0.1 (0.0–0.9)	0.2 (0.0–1.2)	0.5 (0.2–1.2)	0.3 (0.1–1.3)		2.6 (1.9–3.6)	0.2 (0.1–0.4)	1.0 (0.7–1.4)

(*continued on next page*)

European Journal of Internal Medicine xxx (xxxx) xxx–xxx