JGG 2023;71:4-7
doi: 10.36150/2499-6564-N524

Hyperactive delirium in the emergency department: the continued case of B.M.

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The prevalence of delirium in emergency department (ED) ranges from 7 to 13%; however, delirium is often underdiagnosed in that setting. This report describes two different approaches to a hypothetical case report of an old man admitted to the ED after an injurious fall, and whose clinical conditions rapidly worsen due to hyperactive delirium.

Key words: delirium, Emergency Department, geriatric assessment

INTRODUCTION

Delirium is a geriatric syndrome characterized by acute onset and fluctuating course, cognitive and attention deficits which are caused by a medical condition and cannot be explained by preexisting neurocognitive disorders [1]. Delirium prevalence and incidence are high in acute hospital wards as well as in emergency departments (EDs), where the prevalence of delirium ranges between 7 and 13% [2-4]. Delirium is often due to the interaction between predisposing factors (pre-existing characteristics of the patient) and precipitating factors (acute stressors), which interplay in an inverse proportional way [2]. A significant heterogeneity in the susceptibility to develop delirium has also been reported: frail persons are more likely to exhibit delirium, even when only milder triggers are present [5]. Previous studies have shown that infections are among the most frequent precipitating factor of delirium in the ED setting (30-40% of cases), followed by acute neurological diseases, and metabolic and electrolyte disorders [6,7]. Delirium in older patients during the stay in ED could also be triggered by a prolonged exposure to a unfriendly environment, the administration of new medications, the application of urinary catheters and the use of multi-parameter monitors, which also contribute to determine a noisy and chaotic setting [8,9]. Yet, delirium is still often unrecognized in the ED setting: previous studies have shown that underdiagnoses are more than 50% of total cases of delirium [7,8]. This finding can be explained by the fact that most ED clinicians do not screen for delirium in their daily practice because of lack of time and geriatric expertise [7,8]. As delirium is associated with several adverse outcomes (i.e. prolonged hospitalization, institutionalization, high risk of death and accelerated long-term cognitive and functional decline), early identification of patients at risk through validated tools and early treatment of delirium is of vital importance.
Here we present two different approaches to the same case of an older man admitted to the ED after an injurious fall.

Received: April 7, 2022
Published: March 14, 2023

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How to cite this article: Braglia Orlandini F, Pirozzi A, Chizzoli A, et al. Hyperactive delirium in the emergency department: the continued case of B.M. Journal of Gerontology and Geriatrics 2023;71:4-7. https://doi.org/10.36150/2499-6564-N524

HYPOTHETICAL CASE REPORT

Approach 1: a 70-year-old man was admitted to the ED after an injurious fall. Medical history included hypertension and dementia. He was chronically prescribed with ramipril 5 mg and donepezil 5 mg. The physical examination showed dry skin and oral mucosa; biochemical exams revealed high c-reactive protein, leucocytes and creatinine. The temperature was 38.5°C, systolic blood pressure was 95/60 mmHg, but the other vital signs were normal (Tab. I); urine test was positive for nitrite, esterase and glycosuria; the chest radiography was normal. A urinary catheter was positioned, and a brain CT scan ordered. The CT was negative for acute events whereas an X-ray of the hip showed a femur fracture. The physician diagnosed the fracture, suspected low urinary tract infection (UTI) and requested urine culture and administration of i.v. ceftriaxone 2 gr and normal saline. The physician also prescribed i.v. opioid as pain killer. The prompt admission to the hospital trauma ward was not possible due to overload, thus, in the meanwhile, the patient lied on a stretcher in the ED's hallway. Few hours later, the patient was shouting his wife's name clearly hallucinated. He tried to stand up despite the fracture, and he showed aggressive behaviors towards healthcare professionals. Quietapine b.i.d. was prescribed, but was not sufficient to calm down the patient, and thus i.v. hydration was not completed; six hours later (next morning), the patient was aggressive with nurses and physicians, trying to stand up despite the fracture and refusing to take oral medications. Blood tests showed a worsening in renal function and the antipsychotic was still part of patient's prescriptions at the trauma ward admission.

Approach 2: a 70-year-old man was admitted to the ED after an injurious fall. Medical history included hypertension and dementia. He was chronically prescribed with ramipril 5 mg and donepezil 5 mg.

At ED admission the triage nurse employed the Delirium Risk Assessment Tool (DRAT) to calculate the patient's risk of delirium. DRAT is a validated tool that accurately identifies older patients at increased risk of developing delirium using four variables (age > 75 years, history of dementia, hearing loss, use of psychotropic drugs) [10] (Fig. 1). If the score is 3 or more, the patient is at high risk of delirium and should be periodically assessed with a delirium screening tool and preventive strategies should be applied. The DRAT score was 4 and the 4AT was administered to the patient. The 4AT is an internationally recognized delirium screening tool that evaluates alertness, cognitive functions, attention and changes in mental status; a score between 1 and 3 suggests cognitive impairment and a score of 4 or more suggests probable delirium or delirium superimposed

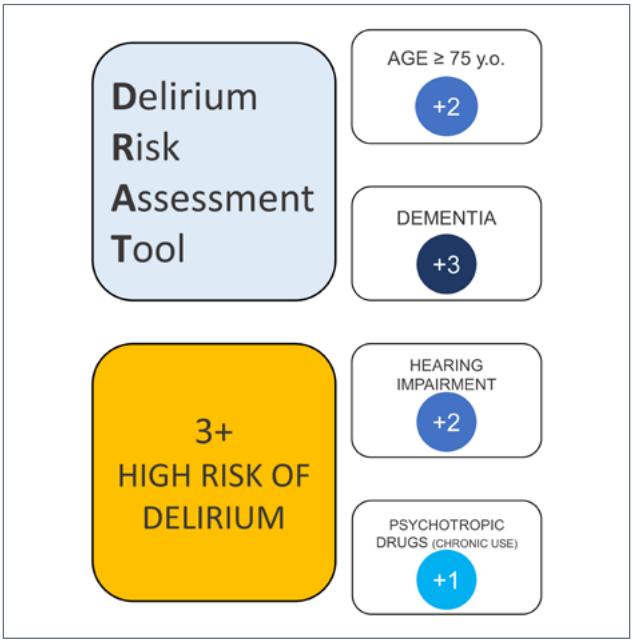

Figure 1. Delirium risk assessment tool (DRAT).

on dementia [11]. The 4AT score was 3 (0+2+1+0), suggesting the presence of cognitive impairment, but not delirium. The physical examination showed dry skin and oral mucosa; biochemical exams revealed high c-reactive protein, leucocytes and creatinine. The temperature was 38.5°C, systolic blood pressure was 95/60 mmHg, but the other vital signs were normal (Tab. I); urine test was positive for nitrite, esterase and glycosuria; the chest radiography was normal and an X-ray of the hip showed a femur fracture. The physician diagnosed the fracture, suspected low urinary tract infection (UTI) and requested urine culture and administration of i.v. ceftriaxone 2 gr, normal saline, and acetaminophen as painkiller. He also assessed the level of frailty of the patient using the clinical frailty scale [12], and registered on the clinical records a score of 6 indicating moderate frailty. The prompt admission to the hospital trauma ward was not possible due to overload, thus, in the meanwhile, the patient lied on a stretcher in the ED's hallway.

Few hours later, the patient was shouting his wife's name clearly hallucinated. He tried to stand up despite the fracture, and he showed aggressive behaviors towards healthcare professionals. Vital signs were normal, but the 4AT score was 12 (4+2+2+4). The clinician assessed possible precipitating factors of delirium and found infection, pain, dehydration, acute renal injury, isolation and unfriendly environment. He asked the patient's wife to come and sit with him; then, he found a more comfortable location in the ED (a quiet room with a window). Finally, given the persistence of agitation and aggressiveness, he administered one shot of

Table I. Vital signs and laboratory data of the patient.

	Day 1	Day 2	Reference range, adults
Blood pressure mmHg	95/60	120/75	
Heart rate, bpm	95	72	
Temperature, °C	38,5	36,8	
WBC, 10^3/µL	12,4	10.6	4.0-10.8
RBC, 10^6/µL	3.9	3.7	4.5-5.5
Hb, g/dL	12.0	11.6	14-18
Hct, %	35.6	32.6	42-52
MCV, fL	84.2	84.3	82-94
PLT, 103/µL	260.000	255000	130-400
Neutrophils, % (10^3/µL)	85 (10.5)	78 (8.26)	(1.50-8.00)
Eosinophils, % (10^3/µL)	0.5 (0.06)	0.6 (0.06)	(0.00-0.80)
Basophils, % (10^3/µL)	0.2 (0.02)	0.4 (0.04)	(0.00-0.20)
Lymphocytes, % (10^3/µL)	12 (1.4)	17 (1.8)	(0.90-4.00)
Monocytes, % (10^3/µL)	2.3 (0.3)	4 (0.4)	(0.20-1.00)
Creatinine, mg/dL	2,2	1,7	0.7-1.2
Urea, mg/dL	75	65	17-49
Sodium, mmol/L	143	138	136-145
Potassium, mmol/L	4,3	4,2	3.4-4.5
Chlorine, mmol/L	98	99	98-107
C-reactive protein, mg/L	45	20	<5
AST, U/L	38	37	18-39
ALT, U/L	35	35	13-60
GGT, U/L	40	42	28-100
Bilirubin, mg/dL	0.8	0.8	< 1.2
Amylase, U/L	40	41	28-100
Lipase, U/L	54	53	13-60

haloperidol (0.5 mg, oral administration). The patient calmed down and fell asleep; intravenous hydration was completed. Six hours later (next morning), the patient was confused, but quiet; the 4AT score was 4 (0+2+2+0). Blood tests showed an improvement in renal function and he was admitted to the trauma unit for the intervention without any antipsychotic prescription and with a note in the ED records of 'patient at high risk of delirium'.

DISCUSSION

The pathogenesis of delirium is often multifactorial depending on the interaction between predisposing factors (i.e. older age, cognitive and functional impairment, comorbidities, alcohol misuse) and precipitating factors (i.e. infections, new medications, physical restraints, longer staying in ED, bladder catheter, surgery) [13].

We report two different approaches to the same case of an old man with predisposing and precipitating factors admitted to an ED. The patient was affected by dementia and chronically treated with psychotropic drugs, he had pain, an infection and dehydration. Further, he was left alone in the ED.

In the first approach, a urinary catheter was positioned at ED admission and an opioid was used as pain killer. No evaluation was done in the ED regarding the patient's frailty, and factors precipitating delirium, and an antipsychotic was prescribed to treat agitation. The patient was admitted to the trauma ward with the prescription of quietapine 25 mg b.i.d.

In the second approach, the patient's evaluation started at triage with the calculation of the DRAT score. DRAT relies on easily-collectable data and it is time-saving. This tool was developed and validated in two Italian EDs, and it is easy to administer by most healthcare figures irrespective of their expertise [10]. Further, the ED physician calculated the CFS score. With frailty marking the condition of exhaustion of the homeostatic capacities to face exogenous stressors, frail individuals have greater risks of developing delirium (2,2 fold) than robust ones [5]. On the other hand, delirium is associated with higher levels of frailty and the coexistence of frailty with delirium drastically worsens the prognosis [15].

Following the acknowledgment of a higher delirium risk, the 4AT was administered to the patient. The 4AT is highly sensitive and specific for delirium when the score is ≥ 4 [11]. The test should be repeated every 8 hours and every time there is a change in the attention or behavior of the patient. Periodical re-evaluations increase sensitivity, making more accurate the identification considering the typical fluctuations in mental status occurring during delirium. Once the diagnosis of delirium was made, the first attempt was to check for precipitating factors and correct them (i.e. antibiotic for infection, i.v. fluids for dehydration, and presence of caregiver) (Tab. II). Given that non-pharmacological measures were not adequate to control symptoms, and the patient was at risk of harming himself, a pharmacological approach with a one shot low dose haloperidol was administered [14]. The day after the patient was admitted to

Table II. Delirium precipitating factors and corrections.

Delirium precipitating factors	Corrections
Fever	Antipyretic treatment (acetaminophen)
Urinary tract infection	Antibiotic treatment (ceftriaxone)
Dehydration	fluid replacement
Loneliness, change in habits/setting	Relative's care
Pain	Pain killer (acetaminophen)
Noisy environment	Delirium room/comfortable environment

the trauma ward without any antipsychotic prescription and with a note in the ED records of 'patient at high risk of delirium'.
The second approach reflects the contents of the 'Procedure to increase Delirium diagnosis, prevention and treatment' in adults admitted to all the clinical wards of the Spedali Civili in Brescia, Italy (the procedure is in Italian and is available upon request to the corresponding author).

CONCLUSIONS

Delirium is a geriatric syndrome whose possible complications range from a prolonged hospitalization to a higher risk of death. Given that it is preventable, recognizing older patients at risk of developing this geriatric syndrome is of most importance. The DRAT and the CFS are easy and quick to administer even in the ED setting and can identify older patients at risk of delirium. Further, its early recognition through validated tools is also relevant: the 4AT is a well-known and accurate tool used to screen for delirium and to monitor it. Once diagnosed, the first step should be checking for precipitating factors and correcting them; only if this is not sufficient, and the patient is at risk of hurting himself, a pharmacological approach can be considered.

Conflict of interest statement
The authors declare no conflict of interest.

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

Author contributions
FBO, AP, AC: designed that clinical case and wrote the first draft; GR, AZ, AM: critically revised the manuscript.

Ethical consideration
Not applicable.

References

1 Bowman EML, Cunningham EL, Page VJ, et al. Phenotypes and subphenotypes of delirium: a review of current categorisations and suggestions for progression. Crit Care 2021;25:1-13. https://doi.org/10.1186/s13054-021-03752-w

2 Kennedy M, Enander RA, Tadiri SP, et al. Delirium risk prediction, healthcare use and mortality of elderly adults in the emergency department. J Am Geriatr Soc 2014;62:462-469. https://doi.org/10.1111/jgs.12692

3 Bellelli G, Morandi A, Di Santo SG, et al. "Delirium Day": a nationwide point prevalence study of delirium in older hospitalized patients using an easy standardized diagnostic tool. BMC Med 2016:1-12. https://doi.org/10.1186/s12916-016-0649-8

4 Elie M, Rousseau F, Cole M, et al. Prevalence and detection of delirium in elderly emergency department patients. Cmaj 2000;163:977-981.

5 Persico I, Cesari M, Morandi A, et al. Frailty and delirium in older adults: a systematic review and meta-analysis of the literature. J Am Geriatr Soc 2018;66:2022-2030. https://doi.org/10.1111/jgs.15503

6 Shenvi C, Kennedy M, Austin CA, et al. Managing delirium and agitation in the older emergency department patient: the ADEPT tool. Ann Emerg Med 2020;75:136-145. https://doi.org/10.1016/j.annemergmed.2019.07.023

7 Aslaner MA, Boz M, Çelik A, et al. Etiologies and delirium rates of elderly ED patients with acutely altered mental status: a multicenter prospective study. Am J Emerg Med 2017;35:71-76. https://doi.org/10.1016/j.ajem.2016.10.004

8 Boucher V, Lamontagne ME, Nadeau A, et al. Unrecognized incident delirium in older emergency department patients. J Emerg Med 2019;57:535-542. https://doi.org/10.1016/j.jemermed.2019.05.024

9 Inouye SK, Charpentier PA. Precipitating factors for delirium in hospitalized elderly persons: predictive model and interrelationship with baseline vulnerability. J Am Med Assoc 1996;275:852-857. https://doi.org/10.1001/jama.275.11.852

10 Zucchelli A, Apuzzo R, Paolillo C, et al. Development and validation of a delirium risk assessment tool in older patients admitted to the Emergency Department Observation Unit. Aging Clin Exp Res 2021;33:2753-2758. https://doi.org/10.1007/s40520-021-01792-4

11 Bellelli G, Morandi A, Davis DH, et al. Validation of the 4AT, a new instrument for rapid delirium screening: a study in 234 hospitalized older people. Age Ageing 2014;43:496-502. https://doi.org/10.1093/ageing/afu021

12 Rockwood K, Song X, MacKnight C, Bergman H, Hogan DB, McDowell I, Mitnitski Aet al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

13 Inouye SK, Westendorp RG, Saczynski JS. Delirium in elderly people. Lancet 2014;383:911-922. https://doi.org/10.1016/S0140-6736(13)60688-1

14 Oh ES, Fong TG, Hshieh TT, et al. Delirium in older persons: advances in diagnosis and treatment. JAMA 2017;318:1161-1174. https://doi.org/10.1001/jama.2017.12067

15 Eeles EM, White SV, O'Mahony SM, et al. The impact of frailty and delirium on mortality in older inpatients. Age Ageing 2012;41:412-416. https://doi.org/10.1093/ageing/afs021