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Delirium in the Emergency Department

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ABSTRACT

Delirium is a medical emergency affecting 7-20% of older patients attending the Emergency Department (ED). If delirium is not recognised in ED 94% will remain unrecognised throughout admission, and mortality increases by 11% for every 48 hours delirium goes undetected.

A retrospective case note review was conducted for all patients over the age of 65 years attending the Leicester Royal Infirmary ED in a six-month period. All patient notes receiving a diagnosis of delirium were reviewed.

Of 17,507 attendances to ED, 82 received a diagnosis of delirium (0.47%). History, observations, examination of chest and abdomen, cognitive assessment, pre-existing care needs, collateral history, and pre-existing mobility were recorded in over 50% of cases. Neurological examination, fluid status, medication review and digital rectal examination (DRE) were recorded in less than 50% of cases. When comparing assessments undertaken by those with geriatric medicine training and those without, only medication reviews, neurological examination and use of sedation showed some benefit of having a geriatrician's assessment.

This paper shows under-recognition of delirium in a busy ED setting. Education, improved awareness and knowledge of the effects delirium can have on patients will help improve care and safety for patients presenting with delirium to EDs.

BACKGROUND

Delirium is defined as, "an aetiologically nonspecific organic cerebral syndrome characterized by concurrent disturbances of consciousness and attention, perception, thinking, memory, psychomotor behaviour, emotion, and the sleep-wake schedule. The duration is variable and the degree of severity ranges from mild to very severe" [1]. Delirium is as an independent predictor of morbidity and mortality [2], and is associated with increased rates of institutionalisation, development of dementia, functional decline, prolonged hospitalisation and higher healthcare expenditures [3-7].

Recognising delirium is difficult as patients frequently present with non-specific symptoms or are unable to provide accurate histories. Delirium can result in presentation to Emergency Departments (EDs). EDs in most hospitals within the United Kingdom (UK) are busy, time-pressured environments tasked with assessing patients and making decisions quickly. The recognition, assessment, and management of a confused and agitated, or drowsy and withdrawn, person in this environment is a difficult task.
On average between 7 – 20% of patients presenting to EDs over the age of 65 years do so with a delirious episode [8]. Recognition of delirium early in a patient's admission is of vital importance as mortality rises by 11% for every 48 hour period a patient's delirium goes unrecognised [9][10]. If delirium is not recognised within ED, previous evidence suggests 94% would remain undiagnosed or unrecognised throughout a patient's admission [11]. By suspecting or recognising delirium, interventions and treatment can be initiated that have been shown to reduce duration and impact of delirium [3, 12]. The recognition of delirium remains a challenge in EDs, and initiating these interventions and treatments may be more difficult in the emergency environment. NICE guidance CG103 for the recognition and management of delirium [13] states that once delirium is recognised efforts should focussed on finding and correcting any definite or potential causes. The guidance recommends a full clinical assessment including collateral history and examination followed by blood testing and further investigations or examinations depending on the clinical picture. This study examined how patients with delirium in an emergency setting were assessed, investigated and managed.

METHOD

Setting

This study was undertaken in the Emergency Department at the Leicester Royal Infirmary (LRI), a large teaching hospital in the United Kingdom. In 2015/16 the LRI ED assessed and treated 139,992 patients of all ages, 34,721 of whom were over the age of 65 years (24.80%).

Study aims

The primary study aim was to highlight the coded incidence of delirium within the Emergency Department at the Leicester Royal Infirmary in patients over the age of 65 years and compare this to expected published rates.

The secondary aim was to evaluate the assessment and management of patients attending with delirium to recognise any areas of improvement or commendation.

Study design

A retrospective case note analysis of all patients over the age of 65 years presenting to the Leicester Royal Infirmary ED was performed between 1st September 2015 and 29th February 2016.

On attending the ED at LRI every patient was recorded via an online tracking system; iSOFT Emergency Department Information System (EDIS for SQL server; Version 10.38.1001 Build 19) including patient age, presenting reason and final diagnoses (on departing the ED).

All cases identified where a primary diagnosis of, or including, delirium was made were reviewed by the primary investigator to highlight common themes regarding the initial assessment, investigation and management of these patients.

Demographic data, presenting complaint, final diagnosis, type of delirium at presentation, components of history, examination and investigation and any therapeutic interventions used including sedation were recorded for each patient. NICE guideline CG103 [13], expert geriatric opinion from local consultants and associated local Trust

guidance determined which components of assessment, examination and investigation were appropriate for data collection.

Statistical analysis was performed using Microsoft Excel. The quantitative data were tabulated in excel, and logical checks were undertaken to look for errors (for example, extreme values). Categorical data were presented as absolute numbers and percentages, and mean (SD) unless otherwise stated. All comparisons looking for statistically significant differences were performed using Fisher's Exact Test.

RESULTS

Demographic information

By searching EDIS we were able to identify all ED attendances by patients over the age of 65 years, and all ED attendances within this group that received a final primary diagnosis that included delirium (see figure 1). These cases were of particular interest as delirium itself had been recognised as the primary diagnosis and therefore suggests that either the delirium had been recognised as the primary cause for concern, or the cause of the delirium was not certain.

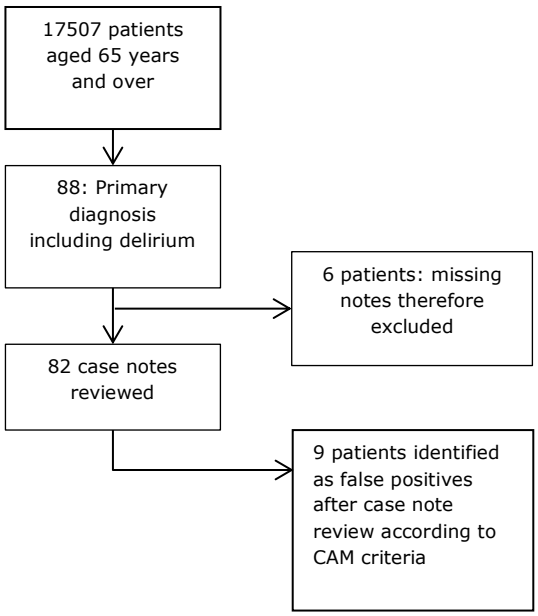

Figure 1: Case note selection

Of the 82 patients coded as having delirium, 35 were male (42.7%) and the median age was 85 years (IQR: 8 years).

47.5% of the group had a previous (and recognised at time of attendance to ED) diagnosis of dementia. The type of dementia was 'unspecified' in 59% of cases. Otherwise the type of dementia was as follows; Alzheimer's disease (25.6%), Vascular dementia (10.3%), Dementia with Lewy Bodies (5.1%).

95.1% of the patients were admitted from the ED for an inpatient stay. Most were admitted to one of the specialist frailty units (AFU or EFU; 85.9%) with the other patients being admitted to the medical assessment units (13.4%).

Diagnostic Accuracy

During data analysis assessment was made by applying the Confusion Assessment Method (CAM) diagnostic criteria to each patient's notes to assess if delirium was correctly diagnosed. There were nine cases where delirium was identified without documented evidence according to CAM criteria (11.0%); four patients were described as 'being at baseline confusion' which was corroborated by collateral histories, two patients were described as having a 'stepwise cognitive decline', two patients had suffered strokes and were experiencing dysphasia, and one patient had symptoms more in keeping with transient global amnesia than delirium.

Despite the retrospectively incorrect delirium diagnosis, these case notes were included in the final analysis as scrutiny of how these patients were assessed and managed was thought to be of interest and importance.

Presenting complaint and type of delirium

Patients presented to the ED with a variety of complaints, the most common was 'confusion' (50%), but other reasons to attend included hallucinations (6.1%), 'drowsiness' (2.4%), 'visual disturbance not hallucinations' (2.4%), 'aggression', 'off food' and 'found on floor' (all 1.2%).

Symptoms causing concern after assessment included 'agitation' (47.6%), 'less or un-responsive' (29.3%), 'challenging behaviour' (19.5%), and 'not eating and drinking' (7.3%). 12 patients displayed none of the above listed 'symptoms of concern' as identified by notes review (14.6%), with some patients displaying more than one 'symptom of concern' (18.3%).

51.2% expressed a hyperactive delirium, 34.0% expressed a hypoactive delirium and those expressing no 'symptoms of concern' were classified as "Not clear" (14.6%). No patients had evidence to suggest a mixed delirium during their ED attendance.

Initial clinical assessment

54.9% of patients were initially seen by a junior doctor (foundation year 2: 15.9%, unspecified SHO grade: 22.0%, trust grade: 11.0%, specialist registrar 6.1%) with a further 7.3% seen by an advanced nurse practitioner. 3.7% of patients were initially seen by a general practitioner working in ED, 2.4% by an ED consultant, 4.9% by a geriatric medicine trainee, 6.1% by an ED consultant with a specialist interest in geriatric emergency medicine and 8.5% by a geriatric medicine consultant. In 12.2% of cases there was no record of the grade of doctor assessing the patient initially. 12 patients who were clerked by an ED practitioner of any grade were then reviewed by physicians with some geriatric training (geriatric medicine consultant, geriatric medicine trainee, or ED consultant with a specialist interest in geriatric emergency medicine). 34.1% of patients were reviewed by a physician with geriatric training at some point during the ED attendance.

During initial assessment performed by the clerking doctor in ED we found that some components including history, observations, and examination of the chest and abdomen were consistently performed (see Figure 2). Other components that were performed in over 50% of cases included cognitive assessment by any method 70.7%, record of pre-existing care needs 69.5%, collateral history from family/carer 64.6%, and record of pre-existing mobility 57.3%. Cognitive assessment was most frequently via AMT4 (Abbreviated Mental Test) testing (65.9%). The only other method used was AMT10 testing (3.7%) with one patient was tested with both AMT4 and AMT10 (1.2%). No cognitive assessment was performed in 29.3% of cases.

Components of the initial assessment performed in less than 50% of cases included any form of neurological examination 45.1%, assessment of fluid status 29.3%, evidence of medication review 9.8% and, digital rectal examination (DRE) 4.9%. It is important to note that evidence of medication review required some documented evidence of assessment and rationalisation of medications; if a medication list was documented without evidence of rationalisation this was recorded as medication review not taken place.

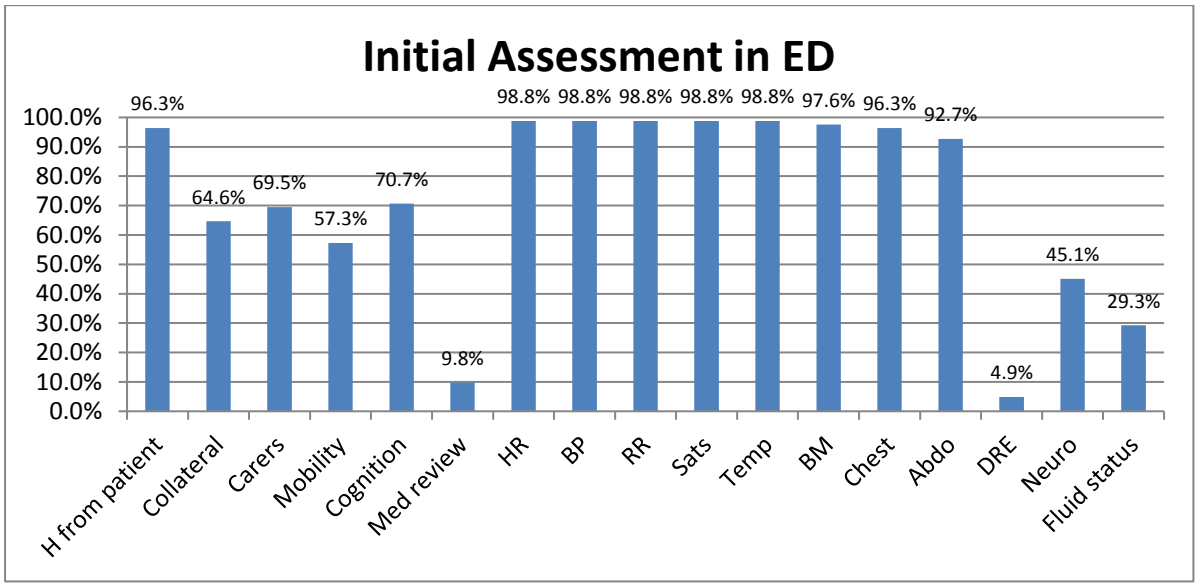

Figure 2: Initial Assessment in ED

Legend: Documented evidence of: 'H from patient': history taken from patient; 'Collateral': history taken from other source such as witness / family / carer; 'Carers': usual care arrangements prior to admission; 'Mobility': pre-existing mobility; 'Cognition': cognitive test; 'Med review': medication / drug review; 'HR': heart rate; 'BP': blood pressure; 'RR': respiratory rate; 'Sats': oxygen saturations; 'Temp': temperature; 'BM': blood sugar; 'Chest': examination of heart and lungs; 'Abdo': examination of the abdomen; 'DRE': digital rectal examination; 'Neuro': neurological examination; 'Fluid status': examination of clinical fluid status.

Further investigations

With respect to the investigations that were ordered for these patients, some elements were performed routinely (full blood count (FBC) and urea and electrolytes (UE) 100%, near patient testing (NPT) including glucose 97.6%). However, the other investigations evaluated were performed less routinely (ECG 76.8%, liver function tests (LFT) 50.0%, urine dipstick testing 46.3%, clotting screen 35.4%, chest radiograph (CXR) 41.5%, C-reactive protein (CRP) 40.2%, bone profile 18.3%, CT Computed tomography) scan of the head 18.3%, thyroid function testing (thyroid stimulating hormone; TSH) 9.8%, haematinics (vitamin B12, folate, ferritin) 3.7% and urine culture 1.2%; see Figure 3)

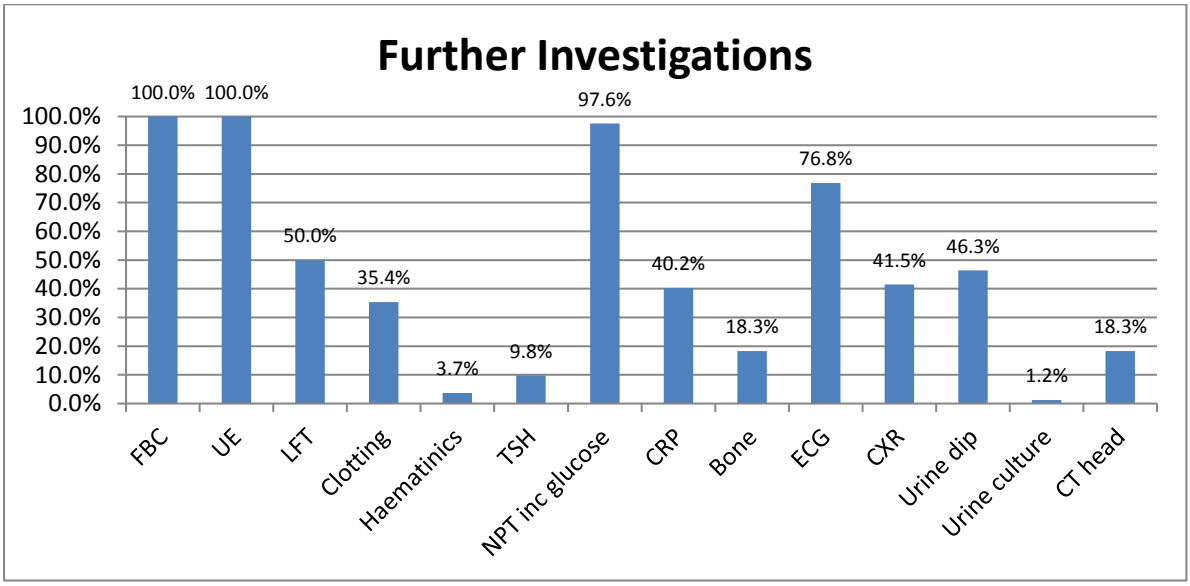

Figure 3: Further Investigations

Legend: Request made for: 'FBC': Full blood count; 'UE': urea and electrolytes; 'LFT': liver function tests; 'Clotting': coagulation screen; 'Haematinics': including vitamin B12, folate, ferritin; 'TSH': thyroid function testing via thyroid stimulating hormone; 'NPT inc glucose': near patient testing including blood glucose; 'CRP': C-reactive protein; 'Bone': bone profile; 'ECG': electrocardiogram; 'CXR': chest radiograph; 'Urine dip': urine dipstick testing; 'CT head': computed tomography scan of the head

Sedation

Eight patients (9.8%) within the sample group received sedation during their ED stay. All eight patients were described as suffering from hyperactive delirium and sedation was used for 'agitation' (n=7), and/or 'challenging behaviour' (n=5). Lorazepam was used in five cases with doses ranging from 2mg - 4mg; the route of administration was always

intravenous. Haloperidol was used in two cases with doses of 1mg and 1.5mg, both given intramuscularly. One patient (12.5%) was given oral diazepam at their usual dose to relieve pre-existing anxiety (not thought to be related to delirium). None of the cases had documented evidence of non-pharmacological de-escalation techniques being used or attempted.

Comparing geriatrician and non-geriatrician assessments

28 patients (34.1%) were reviewed by a physician with geriatric training (consultant geriatrician, ED consultant with a specialist interest in geriatric emergency medicine, or geriatric medicine trainee) at some point in their ED attendance.

By comparing the assessments performed by physicians trained in geriatric medicine with assessments by practitioners with no formal geriatric medicine training there were only two components showing a statistically significant difference (Table 1).

Table 1: Initial assessment, further investigation and management decision: comparing assessments by those with formal Geriatric Medicine training with those who do not

INITIAL ASSESSMENT					**FURTHER INVESTIGATION**			
	Geriatrician (n=28)	Non-Geriatrician (n=54)	p value			Geriatrician (n=28)	Non-Geriatrician (n=54)	p value
History from patient	100.0%	94.4%	0.548		FBC	100.0%	100.0%	1.000
Collateral	67.9%	63.0%	0.808		UE	100.0%	100.0%	1.000
Carers	60.7%	74.1%	0.312		LFT	42.9%	53.7%	0.485
Mobility	50.0%	61.1%	0.356		Clotting	28.6%	38.9%	0.466
Cognition	67.9%	72.2%	0.799		Haematinics	3.6%	3.7%	1.000
Med review	**21.4%**	**3.7%**	**0.017**		TSH	10.7%	9.3%	1.000
HR	100.0%	98.1%	1.000		VBG inc glucose	96.4%	98.1%	1.000
BP	100.0%	98.1%	1.000		CRP	39.3%	40.7%	1.000
RR	100.0%	98.1%	1.000		Bone	17.9%	18.5%	1.000
Sats	100.0%	98.1%	1.000		ECG	71.4%	79.6%	0.420
Temp	100.0%	98.1%	1.000		CXR	32.1%	46.3%	0.246
BM	96.4%	98.1%	1.000		Urine dip	50.0%	44.4%	0.649
Chest	96.4%	96.3%	1.000		Urine culture	3.6%	0.0%	0.341
Abdo	96.4%	90.7%	0.659		CT head	25.0%	14.8%	0.366
PR	7.1%	3.7%	0.603		**TREATMENT DECISIONS**			
Neuro	**57.1%**	**38.9%**	**0.016**		IV Abx	21.4%	37.0%	0.212
Fluid status	32.1%	27.8%	0.799		**Sedation**	**0.0%**	**14.8%**	**0.046**
					DNAR	10.7%	3.7%	0.332
					Esc plans	10.7%	3.7%	0.332

DISCUSSION

We found that recorded diagnoses of delirium within a busy ED environment was far lower than would be predicted from research studies of its prevalence. This may be explained by the observation that usually only one diagnosis code was used on departing the ED, and hence that patients suffering delirium secondary to another condition were not included in this study. Nevertheless, even when recorded, the assessment and management of patients with delirium was variable. This under-recognition and

variability in assessment and management may impact on patient outcomes including morbidity and mortality.

This study was based at a single site and it is therefore unclear as to how representative the results are. Since presumably a large number of patients with delirium were not included in this study this study does not describe how every patient with delirium were assessed. However this study has concentrated on the cases where delirium has been made as a primary diagnosis and therefore gives information on actions taken when presented with a patient who is confused for no obvious reason.

Currently there is no widely accepted screening process for delirium in an ED setting. Although a majority of patients (70.7%) received a cognitive assessment, predominantly in the form of an AMT4 (65.9%), a recent validation study [14] found that although AMT4 has a good sensitivity for delirium (92.7%), specificity was poor (53.7%). Many other screening tools for delirium have been designed including 4A's Test (4AT), brief Confusion Assessment Method (bCAM), Months of the Year Backwards (MOTYB), and Single Question in Delirium (SQID). Most of these show much better outcomes in sensitivity, specificity and negative predictive values [14, 15]. Despite the availability of these new validated screening tools the current NICE guidance [13] advocates the use of the Confusion Assessment Method (CAM) for recognition and diagnosis of delirium. CAM can be difficult to understand and when performed by minimally trained clinical users, sensitivity drops to 40% for delirium [15]. This is of particular interest when considering diagnosis in the ED where initial assessment is routinely performed by allied health professionals or medical staff who may not have any formal specialist training or interest. Further education and training for emergency medicine staff may increase the recognition and/or recording of delirium and hence its management and outcome.

In general physical examination consisted of routine observations (HR, BP, RR, Sats, Temp, BM) and examinations of chest and abdomen. By limiting examination to these components there is the potential to overlook important causes for delirium such as constipation or dehydration. The investigations routinely ordered (FBC, UEs) were those that are considered routinely for all patients presenting for any reason. The relative lack of further tests, such as thyroid function, calcium, haematinic profile and a digital rectal examination, together with the low rates of formal medication reviews, may reflect a lack of confidence ED staff in assessing a patient with delirium, or may reflect a preference to defer further investigation. With respect to the low rates of requests for

more invasive or complicated investigations (such as urine culture, CT head and CXR), this may be explained by tests only being ordered when clearly indicated and appropriate.

We found that hyperactive delirium was the most common type of delirium recorded in the ED. This differs from the majority of the published literature which reports that hypoactive delirium is the most common type [11, 16, 17]. This is a concern because hypoactive delirium has the worst prognosis. Education for ED staff and tools for ED use need to deal with this.

In the small number of patients who were sedated in this study, intravenous doses of benzodiazepines were administered that were not in keeping with current NICE guidelines [13]. This was likely to be in part related to conflicting guidelines and evidence that are used frequently in the ED, for instance, NICE Guidance NG10: Violence and aggression: short-term management in mental health, health and community settings [18] which advocates the use of intramuscular lorazepam first line. A full analysis of why drugs and doses were chosen was not been performed.

When comparing those with geriatric medicine training and those without, the majority of assessments showed no significant difference. This is likely to be attributed to the environment in which the assessments were taking place. The ED is a fast paced, high intensity and high stress place of work where the primary aim is to triage and provide immediate treatment. It can therefore be appreciated that an environment like this can alter the assessments that are undertaken. The presence of full neurological examination ($p=0.016$), documented medication review ($p=0.017$) and the use of sedation ($p=0.046$) did show a significant difference between these two groups with geriatricians undertaking neurological examinations and medication reviews more often, and using sedative medication less. This represents a better quality assessment and management plan by those with specialist training, as one would expect. Although not statistically significant, there is also an important, observed difference in rate of ordering a CT scan of the brain. We found that geriatricians had a higher rate of requesting a CT brain than those without this training. This has not been further explored in this study however may be related to patients with more severe delirium receiving review by those with a geriatric medicine background.

FINANCIAL DISCLOSURE

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CONTRIBUTION OF AUTHORS

C.S. collected data; C.M. interpreted data and prepared figures; C.M. drafted manuscript; C.M. and S.S. edited and revised manuscript; C.M. and S.S. conceived and designed research; C.M. and S.S. approved final version of manuscript

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