



Robotic therapy pet for inpatient delirium management: A quality improvement initiative

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Background

Delirium, a state of acutely increased confusion and fluctuating level of alertness, is a common problem in hospitalized patients, particularly those with dementia. Confused patients may attempt to pull out lines, get out of bed, or even assault staff. This contributes to longer hospital stays, worse outcomes, and demoralization of providers [1].

Agitation in these patients is routinely treated with sedating medications or physical restraints to maintain safety of the patient and staff [2]. Unfortunately, this can be traumatic for all parties, and may actually worsen delirium and complications.

Robotic companion animals (RCAs) are increasingly used as an alternative to pharmacotherapy for management of behavioral disturbances in people with dementia living in the community and care facilities [3,4]. There is evidence for inpatient delirium, as well [5]. We tested the feasibility of a RCA in a local neurosciences inpatient unit.

Aim #1: Evaluate the effect of the robotic cat on pharmacological and non-pharmacological interventions for agitation in patients at risk of delirium

Aim #2: Determine whether the use of a robotic cat can reduce the length of hospital stay, number of falls, and behavior codes in patients at risk for delirium

Methodology

Patients with a history of major neurocognitive disorder (dementia) are automatically on delirium protocol at admission. This nursing-led clinical initiative involves frequent re-orientation, serial neurological assessments, and managing environmental stimuli.

Patient inclusion criteria:

- Admitted to S10 at Regions
- Major neurocognitive disorder
- Mentally/physically able to interact with the cat
- Length of stay <30 days

Exclusion criteria:

- Medications administered for terminal sedation, procedures,
- Not on hospice/comfort care
- Home medications

Half the eligible patients were offered a robotic cat in addition to the usual delirium protocol, while half received the standard protocol only.

Nurses screened patients for eligibility on admission to the ward (S10). Data was gathered through chart review.



Results

Table 1. Patient characteristics

	Cat N = 16	No Cat N = 9	Overall N = 25	p-value
Age, Mean (min-max)	78 (55-62)	80 (62-94)	79 (55-94)	0.59
Gender				
Female	13 (81%)	7 (78%)	20 (80%)	1.0
Male	3 (19%)	2 (22%)	5 (20%)	
Prior behavioral disturbance	4 (25%)	1 (11%)	5 (25%)	0.40
Chronic Diagnosis				
Mixed or unspecified	7 (44%)	5 (56%)	12 (48%)	
Alzheimer's & vascular	4 (25%)	1 (11%)	5 (20%)	
Alzheimer's only	3 (19%)	0 (0%)	3 (12%)	
Other cognitive impairment	2 (12%)	3 (33%)	5 (20%)	
Hospital Diagnosis				
Infection	4 (25%)	2 (22%)	6 (24%)	
Stroke	4 (25%)	3 (34%)	7 (28%)	
Placement	3 (19%)	2 (22%)	5 (20%)	
Other medical	5 (31%)	2 (22%)	7 (28%)	

Table 2. Outcomes

	Cat N = 16	No Cat N = 9	p-value
Length of Stay, Median (IQR)	7 (3.5-10)	7 (6-7)	0.82
Required PRN	9 (56%)	5 (56%)	RR: 1.01 (0.49, 2.09)
PRN Doses Overall, N = 14	N = 9	N = 5	
1-2	5 (56%)	1 (20%)	
3-6	3 (33%)	2 (40%)	
7+	1 (11%)	2 (40%)	
PRN Doses / Day, N = 14	N = 9	N = 5	
Median (IQR)	0.4 (0.1, 1.6)	0.3 (0.2, 1.7)	
Required Safety Assist	4 (25%)	5 (56%)	RR: 0.45 (0.16, 1.26)
Required Physical Restraint	2 (33%)	4 (44%)	RR: 0.28 (0.06, 1.25)
Length of Required Physical Restraint, N = 6	N = 2	N = 4	
< 12 hrs	1 (50%)	1 (25%)	
≥ 12 hrs	1 (50%)	3 (75%)	

-Four patients in the cat group were excluded due to incomplete/inaccurate documentation
 -One patient from each group was excluded for prolonged hospitalization
 -One patient from the cat group was excluded after a rapid transition to comfort cares
 -Behavior codes and falls were too infrequent for meaningful statistical comparison

Citations

[1] McCusker J, Cole MG, Dendukuri N, Belzile E. Does delirium increase hospital stay? J Am Geriatr Soc 2003;51(11):1539-1546.
 [2] Krewulak KD, Steffox HT, Leigh JP, Ely EW, Fiest KM. Incidence and Prevalence of Delirium Subtypes in an Adult ICU: A Systematic Review and Meta-Analysis. Crit Care Med. 2018 Dec;46(12):2029-2035.
 [3] Pike J, Pickering R, Cunningham S. Robot companion cats for people at home with dementia: A qualitative case study on companions. Dementia (London). 2021 May;20(4):1300-1318.
 [4] Park S, Bak A, Kim S, Nam Y, Kim HS, Yoo DH, Moon M. Animal-Assisted and Pet-Robot Interventions for Ameliorating Behavioral and Psychological Symptoms of Dementia: A Systematic Review and Meta-Analysis. Biomedicines. 2020 Jun 2;8(6):150.
 [5] Denby, Abby. "The use of life-like robotic animals in the acute care setting to assist in the care of patients with dementia" (2020). Doctors of Nursing Practice (DNP) Final Projects, 2020-current. 8.

Narrative notes

Gave robotic cat to distract pt while RN got seroquel and pudding. Refused pudding with seroquel but appeared to calm down when distracted with robotic cat

Interactive with [robo] cat and increased happiness reported and willingness to receive help/interventions from nursing staff; robotic cat at bedside, seems to reduce patient's agitation

Has a lot to say about her robotic cat which she has named "Tipsy." We have had no issues with behavioral disturbance during admission; she has been calm and compliant and is responding particularly well to robotic cat

There was a robotic cat in the hospital she really liked it so they purchased one for her and she talks to it and sings to it... Pt is engaging with cat and cat helpful with distraction

Appeared more alert and smiling when robotic cat brought into room

Interactive with [robo] cat and increased happiness reported and willingness to receive help/interventions from nursing staff; robotic cat at bedside, seems to reduce patient's agitation

Patient: "I know it's not a real cat but I like it anyway"

Patient: "I think this cat likes me. He winked at me."

Nurse: "He's so sweet" about the cat is the most I've heard her say this whole time

Conclusions

Although the differences were not statistically significant (possibly due to low power), the qualitative comments show promise for using RCAs with an inpatient population. Use of safety assistants and physical restraints also trended towards being less likely in the RCA group.

Features of non-responders:

- Severely impaired/minimally responsive
- Doesn't like cats
- Severe or uncontrolled pain

Limitations

- Small sample size
- Relatively short stays only
- Variety of dementia types
- Neurosciences floor and nurses
- Incomplete documentation, no objective behavior ratings

This project has demonstrated the utility of a distraction tool for delirium management in carefully selected patients with cognitive impairment. Future projects could include patient responsiveness to alternate RACs (dogs, babies, etc) and whether RACs are more effective for certain patient populations. Going forward, the unit will continue to use the cats at nursing discretion. Utilizing similar initiatives on other units or delirious patients without dementia are potential next steps.