

The Proxy Test for Delirium (PTD)

A New Tool for the Screening of Delirium Based on DSM-5 & ICD-10 Criteria

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Background

Delirium is the most prevalent psychiatric disorder found in the general medical setting. It is associated with increased morbidity and mortality, increased healthcare costs, and a range of other negative outcomes among medically ill patients.¹

While several validated tools are used to screen for delirium in the hospital setting, studies have shown that delirium is misdiagnosed or not detected in over 50% of case across various healthcare settings, up to 85% in the ICU.² This may partly be due to the reliance of these validated tools on the patient's report of symptoms and their (in)ability to engage in active participation on the delirium screening tool itself.² Instead, a screening tool relying on the observations of nursing staff could potentially provide a more accurate assessment of patient's symptoms. Additionally, no currently existing screening tool for delirium has been validated against DSM-5 criteria.⁴

We developed a new tool for the recognition of delirium, the Proxy Test for Delirium (PTD) (Figure 1), which incorporates DSM-5 and ICD-10 diagnostic criteria.^{4,5} The instrument was developed in collaboration with members of the nursing staff.

The PTD eliminates the need of direct patient participation in the assessment; instead, nurses complete the tool at the end of their shift; thus using the full shift patient interaction to gather the information needed to accurately diagnose delirium. In this pilot study, the PTD is evaluated as compared to a validated tool (i.e., CAM) and clinical assessment (i.e., DSM-5 criteria).^{4,6} We hypothesize that the PTD will have equal or better predictive value as standard measures, but easier to use in all clinical environments.

Methods

The study was conducted at Stanford Hospital and Clinics on units housing Neurology, Neurosurgery & General Medicine patients from 4/24/2014 through 7/24/2014. All patients admitted to these units were approached. Exclusion criteria included a patient's unwillingness to participate, their inability to communicate effectively in English or Spanish, and designation of "too sick to participate" by the primary team. Enrolled patients were separately and blindly screened for symptoms of delirium utilizing the PTD (performed by the patient's primary nurse) at the end of their shift, the Confusion Assessment Method (CAM) (performed by a research assistant), and a clinical neuropsychiatric evaluation based on DSM-5 criteria (performed by Psychosomatic Medicine specialist). Neuropsychiatric assessment was treated as a gold standard in diagnosing delirium.

The study was approved by the Stanford's IRB Committee.

Results

Three hundred and nine patients were approached during the study duration, and a total of 278 patients evaluated; of these 213 underwent the standard PTD (Figure 1); along with corresponding CAM and neuropsychiatric assessments. This resulted in 277 triple-paired, blind assessments (i.e., PTD, CAM, and neuropsychiatric evaluations available for comparison) (Figure 2).

Proxy Test for Delirium - Scoring Sheet
Maldonado, et al. Psychosomatic Medicine Service, Stanford University School of Medicine

Patient Name: _____ MR#: _____
Nursing Unit: _____ Nurse Name: _____
Shift Starts Month/Date/Time: _____ Shift Ends Month/Date/Time: _____

Mark the HIGHEST and LOWEST RASS during the shift:

	-5	-4	-3	-2	-1	0	+1	+2	+3	+4
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Place a "Y" for yes, or an "N" for no if either of the statements listed below applies to your patient, based on observations made during the preceding nursing shift and information provided by previous nursing staff & family DURING THE PRECEDING 24 HRS.

	Not at ALL	SOMETIMES	MOST of the time
1. difficulties with attention	0	1	2
2. difficulties with awareness/orientation	0	1	2
3. difficulties with memory	0	1	2
4. difficulties with language	0	1	2
5. difficulties with learning new information	0	1	2
6. difficulties with reasoning and decision-making	0	1	2
7. difficulties with perceptions	0	1	2
8. difficulties with visuospatial abilities	0	1	2
9. demonstrated disorganized thinking	0	1	2
10. demonstrated changes in alertness/behavior	0	1	2
11. experienced changes in sleep pattern	0	1	2
12. changes from baseline cognition & behavior	0	1	2
Total			

Please check ALL THE TERMS THAT APPLY to your patient's presentation over the course of your shift:

<input type="checkbox"/> anger/irritability	<input type="checkbox"/> restlessness	<input type="checkbox"/> combative
<input type="checkbox"/> staring	<input type="checkbox"/> fast/loud speech	<input type="checkbox"/> sparse/slow speech
<input type="checkbox"/> uncooperative	<input type="checkbox"/> swearing/singing	<input type="checkbox"/> unawareness
<input type="checkbox"/> hypervigilance	<input type="checkbox"/> wandering	<input type="checkbox"/> apathy
<input type="checkbox"/> decreased alertness	<input type="checkbox"/> combativeness	<input type="checkbox"/> impatience
<input type="checkbox"/> lethargy	<input type="checkbox"/> laughing	<input type="checkbox"/> decreased motor activity
<input type="checkbox"/> easy startling	<input type="checkbox"/> distractibility	<input type="checkbox"/> nightmares
	<input type="checkbox"/> persistent thoughts	<input type="checkbox"/> euphoria

Figure 1: Proxy Test for Delirium

The average age of these 213 patients was 59.9 years (standard deviation 19.5) with range of 18 – 98 years of age; 54.5% were male. Indications for admission included brain surgery, spinal surgery, cerebral vascular accidents, cardiovascular diseases, seizures, gastrointestinal dysfunction, fever, infection, and pulmonary diseases.

A total of 37 patients (17.3% of the sample) developed delirium for at least 1 day during the study, as captured by the gold standard, a neuropsychiatric assessment based on DSM - 5 criteria.

Results (con'd)

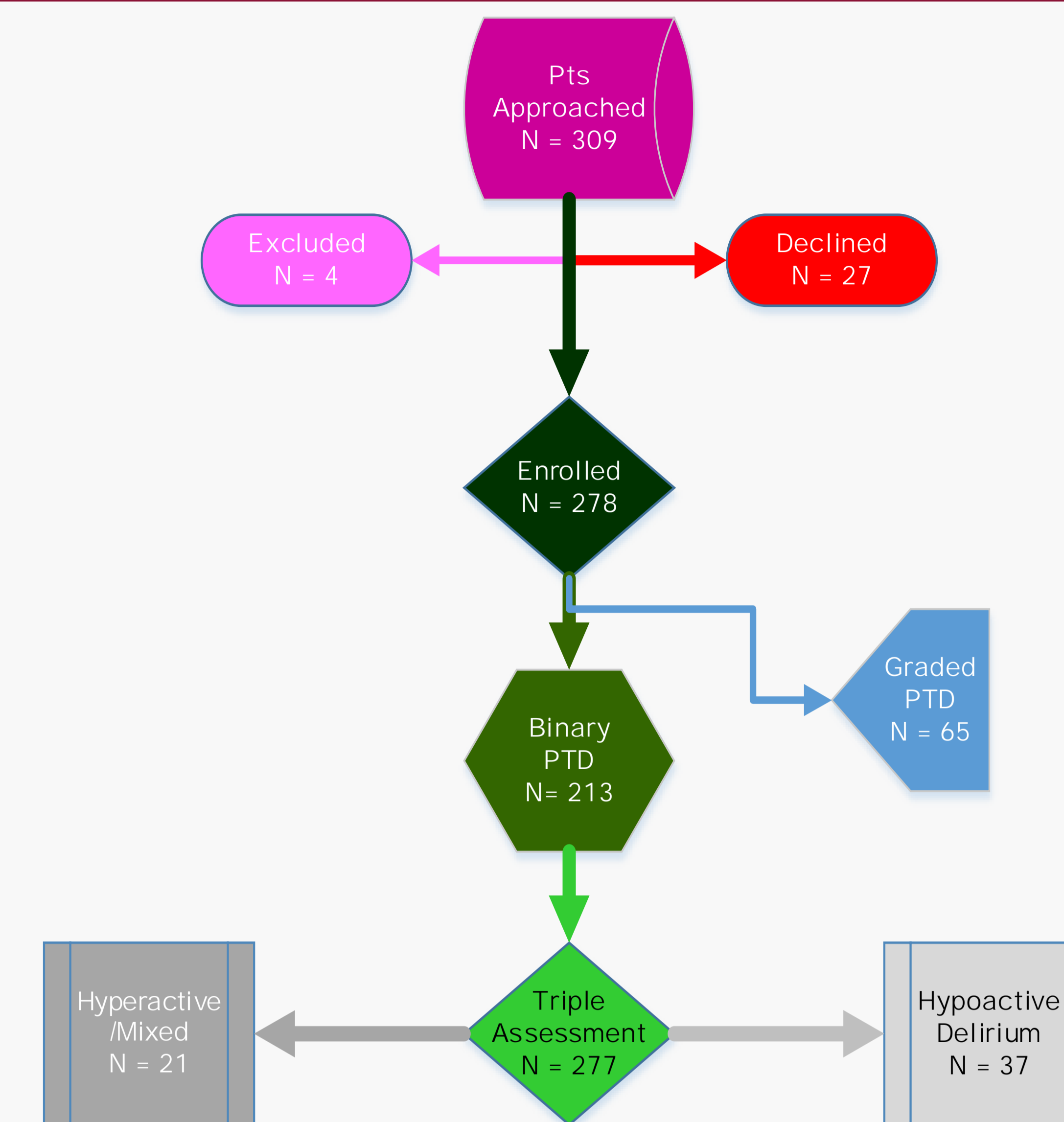


Figure 2: Study Patient Flow

The results suggest that using a cut-off score of ≥ 3 (Figure 3), the PTD has a sensitivity of 77.6%, specificity of 90.4%, positive predictive value of 68.2%, and negative predictive value of 93.8%. In our population, an independent examination with CAM revealed similar results: sensitivity of 75.8%, specificity of 97.7%, positive predictive value of 89.8%, and negative predictive value of 93.9%. See Tables 1a-c. These results are comparable to the result of a systematic review of studies using CAM (overall sensitivity 94%; specificity 89%).⁷

In fact, PTD performed just as well as CAM in identifying delirium, with a McNemar's Test P-Value of 0.739.

However, PTD took less time to administer. After an initial training period of 2 weeks, it took the average nurse less than 1 minute to complete the questionnaire (vs 5 min for CAM⁴ or 3 – 5 min for 3D-CAM⁸).

Nurses reported that PTD was "easier to use" than CAM, "liking" the PTD better than CAM, and being "more willing to complete" the PTD than CAM.

Conclusions

The PTD is the first diagnostic tool for delirium based on DSM-5 and/or ICD-10 criteria. The tool is comprehensive, yet easy to use, and eliminates the problem of a patient's lack or inability to cooperate with the examination. The use of observation based tools, such as the PTD, may contribute to the early recognition and diagnosis of delirium.

Figure 3: ROC Analysis

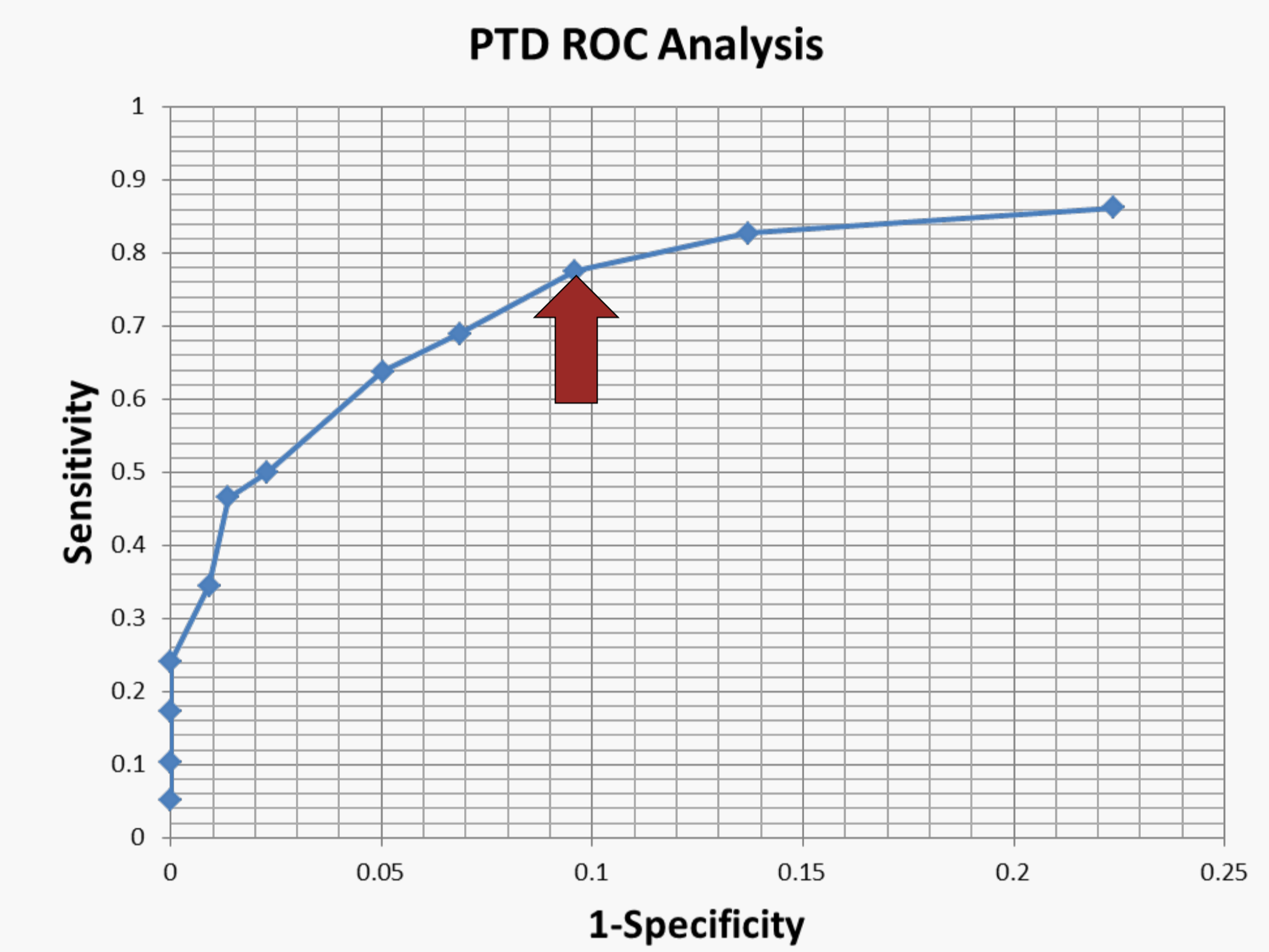


Table 1: Psychometric Properties PTD vs CAM

Cut off 3	Disease +	Disease -	Total	Sensitivity	0.775862
PTD +	45	21	66	Specificity	0.90411
PTD -	13	198	211	PPV	0.681818
Total	58	219	277	NPV	0.938389

CAM	Disease +	Disease -	Total	Sensitivity	0.758621
CAM+	44	5	49	Specificity	0.977169
CAM-	14	214	228	PPV	0.897959
Total	58	219	277	NPV	0.938596

Delirium	CAM +	CAM-	Total
PTD+	40	5	45
PTD-	4	9	13
Total	44	14	58
McNemar's Test P-Value	0.739		

References

- Maldonado JR. Critical care clinics. 2008;24(4):657-722.
- Maldonado, JR. 2014. Delirium. In: Leigh, H. & Siretzer, J. (eds.) Handbook of Consultation-Liaison Psychiatry, 2nd Edition, 2nd ed. New York, NY: Springer.
- Maldonado, JR. 2015. Delirium. In: Fogel, B. & Greenberg, D. (eds.) Psychiatric Care of the Medical Patient, Third ed. New York, NY: Oxford University Press.
- APA 2013. Diagnostic and Statistical Manual of Mental Disorders, 5th Ed., Washington, D.C., American Psychiatric Association.
- WHO (2010). International Statistical Classification of Diseases and Related Health Problems (ICD-10). Geneva, World Health Organization.
- Inouye, S., et al. (1990). "Clarifying confusion: the confusion assessment method. A new method for detection of delirium." Ann Intern Med 113(12): 941-948.
- Wei LA et al. J Am Geriatr Soc. 2008 May;56(5):823-30
- Marcantonio ER et al. Ann Intern Med. 2014;161(8):554-561.