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ON EDUCATION: TEACHING THE NEUROLOGY-PSYCHIATRY INTERFACE USING A FLEXIBLE QUADRANT MODEL

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Abstract

Objective: The emerging field of neuropsychiatry theoretically offers trainees the opportunity to synthesize the core competencies of neurology and psychiatry in managing patients with brain dysfunction. However, there is limited practical evidence to guide trainees on how to achieve this integrative approach in diverse clinical settings.

Method: We describe a clinical training model involving "flexible quadrants", which interweaves the subject material of neurology and psychiatry in a learner-focused, case-based manner, and applies it to general medicine. In this model, N denotes a traditionally neurologic, and P a traditionally psychiatric, approach; patients require different admixtures of each approach at different timepoints, based on their current complaints and the course of their underlying neuropsychiatric conditions.

Results: Several cases are presented in which mindful application of the quadrant model assisted trainees in clinical decision-making and resulted in positive outcomes for both patients and families.

Conclusions: Further research should involve larger groups of neuropsychiatry trainees and supervisors and examine their perceptions of the quadrant model's efficacy as a framework for improving clinical reasoning and patient-centered care.

Key words: flexible quadrants, education

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Background

Although the emerging field of neuropsychiatry theoretically offers trainees the opportunity to integrate strengths of its core disciplines in managing patients with brain dysfunction (Martin 2002; Arciniegas, Kaufer 2006), there is limited evidence to guide trainees on how to apply this practically in diverse clinical settings. Historically, in residency training, funding issues as well as lack of mentors in combined "NeuroPsychiatry" have resulted in a paradigm of 2 months of "neurology" training in Psychiatry and 1 month of "psychiatry" training in Neurology. Psychiatry residents do clinical neurology rotations in their first year of training, then nothing further, until didactic courses in their final year solely in preparation for board exams which include neurology items. As a result of this training schedule, many psychiatry residents come to view neurology learning as useful only for passing the boards, not for helping their care of patients with neuropsychiatric illness.

Neurology residency training is highly focused, and super-specialization is increasingly popular. Residents are encouraged to know facts rather than learn a way to approach a topic. An MRI is often requested and completed before the patient is seen clinically (Stern et al. 2008, Aminoff 2008). Electronic notes, laboratory and imaging panels have contributed to the erosion of bedside clinical skills (Pascuzzi 2009). Time to acquire the requisite knowledge in internal medicine and psychiatry is shorter. While gaining knowledge of "where the lesion is"-often by checking a brain image first- residents lack fundamental knowledge of general medicine, mental disorders, psychopharmacology, neurotransmitter circuitry, side effects of psychoactive drugs, and drug-drug interactions.

We propose a clinical training model which interweaves the subject material of neurology and psychiatry in a flexible, learner-focused, case-based manner, and applies it to general medicine. This practical model (intended to promote improved clinical care for patients with neuropsychiatric problems) involves flexible quadrants (**table 1**). N denotes a traditionally neurologic, and P a traditionally psychiatric, approach, and patients require different admixtures of each approach at different timepoints, based on their current complaints and the course of their underlying neuropsychiatric conditions.

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Definition of each quadrant and its role

np: This reflects general medical conditions with neurological, cognitive, or psychiatric consequences that are first detected and managed outside neuropsychiatric specialty practice. Examples include delirium due to MI, adjustment disorders due to cancer diagnosis, or depression/cognitive side effects due to COPD, CHF or lupus. The conceptualization of this quadrant encourages trainees to address the neuropsychiatric consequences of general medical illness.

nP: This quadrant encourages attention to neurological/cognitive substrate and comorbidity even when the primary diagnosis and/or treatment focus is traditionally psychiatric. In this category is the psychotherapy of patients with life-limiting neurological illness exploring grief, loss and uncertainty. It also includes regularly monitoring cognition and managing deficits in patients with major mental illness, as well as integrating descriptions of neurocircuitry into explanations of psychopharmacologic interventions.

Np: In this category, traditionally neurologic diagnostic approaches are paramount, but pharmacologic interventions are often necessary, and background psychosocial information drives future treatment. In Parkinson's and Huntington's Diseases, diagnosis involves careful neurological exam, neuro-imaging and/or confirmatory genetic testing, yet information on the patient's premorbid educational, cognitive, and psychological function may ultimately determine prognosis. Other relevant conditions include peripheral neuropathy due to alcoholism or stroke with vertebral dissection due to cocaine use. These cases require a traditionally neurologic approach (exam, imaging, NCV, EMG) but subsequent attention to psychiatric comorbidities and their impact on function is necessary to determine the likelihood of psychosocial re-integration.

NP: This quadrant encompasses diseases such as traumatic brain injury, dementia, multiple sclerosis and epilepsy (and non-epileptic seizures) which require constant and fluid integration of neurological and psychiatric assessment and treatment methods. A typical encounter includes a focused neurological examination; evaluation and treatment of psychiatric symptoms; and review of labs, neurophysiology, and neuroimaging. Sophisticated understanding of neuro-circuitry and neuroanatomy, with the ability to explain to patients and family members how localizing signs and/or brain lesions contribute to psychiatric symptomatology, is key in this category. The approach may reduce stigma of neuropsychiatric disease by promoting a holistic view of patients with attention to their socioeconomic and cultural backgrounds, care coordination among providers, and family involvement.

Flexible transitions between quadrants, based on the patient's needs during a particular visit, are integral to the model's goal of integrating neurology and psychiatry with general medical care. The experienced clinician-teacher initiates and sustains the educational approach by modelling flexibility in the interest of comprehensive patient care. For example, a patient's problems may fall into the NP category during one visit, but into the nP category at a future visit; this reflects the need for different treatment strategies at each visit. In our experience, the quadrant model aids clinical decision-making and can result in positive outcomes for both patient and family (**table 2**). Further study of the clinical applicability of this model is needed.

Table 1. *Flexible quadrant model for neuropsychiatry training as applied to the case of a 34yo male patient with non-epileptic seizures and possible comorbid epilepsy*

	N	**n**
P	↕NP↔ Mixed spectrum anxiety disorder, family stressors (ill wife and son), asymmetric palpebral fissures, poor L fine motor coordination. Brain MRI with temporal cuts -> negative.	↔nP↕ Presented with acute depression and plan to slit wrists, prompting psychiatric hospitalization; extensive history of sexual abuse emerged; continued valproate, antidepressants, and individual therapy focused on preventing dissociation/nonepileptic seizures by stress management and grounding
p	↕Np↔ Normal EKG/echocardiogram, EEG (L>R temporal sharp waves and slowing) and normal brain MRI; valproate instituted; long-term seizure monitoring scheduled	↔np↕ Additional work-up for cardiogenic syncope (Holter monitor) -> negative

Table 2. *Case Examples of the Quadrant Model*

Patient with Non-Epileptic Seizures and Possible Comorbid Epilepsy	***Patient with Metastatic Prostate Cancer and Neuropsychiatric Symptoms***
CASE: 34 year old left-handed Italian-American software engineer s/p bizarre behavior, feeling "paralyzed in cement," and loss of time.	**CASE:** 55 year old married father of 3 teenagers with FHx epilepsy and widely disseminated prostate cancer for 1.5 years presenting with encephalopathy.
Np: Normal EKG/echocardiogram, EEG (L>R temporal sharp waves and slowing) and normal brain MRI; valproate instituted; long-term seizure monitoring scheduled	**Np:** severe anxiety with claustrophobia, nocturnal disorientation, visual hallucinations-> brain MRI, EEG and LP with cytology for malignant cells (head MRI showed pachymeningeal enhancement; EEG revealed diffuse theta and delta slowing without epileptiform discharges; LP deferred by team).
NP: mixed spectrum anxiety disorder, family stressors (ill wife and son), asymmetric palpebral fissures, poor L fine motor coordination. Brain MRI with temporal cuts -> negative.	**NP:** treated residual encephalopathy with olanzapine and discontinued methylphenidate which was worsening anxiety
np: additional work-up for cardiogenic syncope (Holter monitor) -> negative	**np:** diagnosed with hepatic encephalopathy from new liver metastases; team supported family during difficult terminal delirium
nP: presented with acute depression and plan to slit wrists, prompting psychiatric hospitalization; extensive history of sexual abuse emerged; continued valproate, antidepressants, and individual therapy focused on preventing dissociation/nonepileptic seizures by stress management and grounding	**nP:** followed up with patient's wife and daughter on several occasions for assessment of bereavement and depression
OUTCOME: free of nonepileptic seizures 1 year later, and returned to work.	**OUTCOME:** wife successfully navigated grief; daughter found it helpful to "see someone who 'got' my dad's issues and knew how he died."

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