

Invited editorial

An agenda for neuropsychiatry as a 21st century discipline

Recent developments have assured the future of neuropsychiatry as a discipline. The many debates on its identity are beginning to appear repetitive and the arguments self-evident (1,2). Both psychiatry and neurology, the disciplines against which it defines its boundaries, seem comfortable with its presence. The professional associations of neuropsychiatry are gaining in strength and involvement, and a number of textbooks of neuropsychiatry are now available (3–5). The recent growth in neuropsychiatric journals has been impressive, with *Acta Neuropsychiatrica* being one of the latest in a number of high-quality journals.

To secure the growth and progress of a profession, it is important to secure its agenda. The argument presented in this article is that neuropsychiatry will not prosper if it continues to define itself as a border zone between psychiatry and neurology. The borderland is a domain that is forever changing, depending on the fortunes of the combatants on either side, necessitating a constant reappraisal of its boundaries. Moreover, despite the calls for an amalgamation of neurology and psychiatry into a supersized specialty of neuropsychiatry (6), it is likely that the two disciplines will retain their independent identities, and neuropsychiatry will only have a future as a third discipline (7). This discipline must plan a secure clinical, research, training and service agenda.

A secure definition?

A variety of definitions have been offered for neuropsychiatry (1,2,6,7) but without a consensus. This is because a profession is finally defined by its subject matter rather than by its broad principles or its approach. Attempts at defining it by highlighting the methodology to deal with disturbances of thought, behaviour or emotion emphasize the neuropsychiatric approach, which

can be used by neurologists, psychiatrists or other professionals. A secure profession depends on some superspecialization and an element of exclusivity. The following will assist neuropsychiatry achieve this status.

A secure clinical agenda?

Neuropsychiatry brings to the clinic the strengths of three disciplines – psychiatry, neurology and neuropsychology. The strengths of psychiatry lie in the rich description of mental phenomena, well-developed interviewing skills, the understanding of multiple causation of behavioural disturbance, the appreciation of individual variation, the ability to deal with ambiguity, the interpersonal context, and the combination of biological with psychological and behavioural therapies. Neurology prides itself in its rigorous clinical examination skills, empiricism and objectivity. Neuropsychology has developed elegant tools for the reliable assessment of cognitive functions and associated behaviour. Together, these skills can be brought to bear upon a number of disorders that are poorly served by either discipline alone.

The diagnosis and management of Tourette's syndrome (TS) exemplify the characteristics of a neuropsychiatric disorder par excellence. While it is recognized by the movement disorder, its assessment is not complete without delving into obsessive-compulsive symptoms, attention deficit, conduct problems, mood disorders, specific developmental disabilities, sleep disorder, intrafamilial communication patterns, peer relationships, scholastic development and personality issues. Its management requires skills in pharmacotherapy, behaviour therapy, family therapy, genetic counseling and rehabilitation. While a general psychiatrist or neurologist possesses the expertise to address some aspects of the disorder, a skilled neuropsychiatrist can deal with this far better than

a combination of clinicians from different disciplines. Being comfortable in many different camps, the neuropsychiatrist can deal with the multifarious problems with a confidence that other specialists would not muster.

Table 1 lists the disorders that can be arguably placed in the neuropsychiatric territory. The cognitive disorders, which include the dementias, are a large group that currently falls into the territory of old-age psychiatry and geriatric medicine for specialized care, with the primary care physician retaining a major role. Given the diversity of presentation of the dementias, neuropsychiatrists are ideally placed to assess and treat

Table 1. The clinical territory of neuropsychiatry

A. Diagnostic categories	
1.	Cognitive disorders
a.	Dementia, especially early-onset dementia, dementia associated with movement disorders (eg Huntington's and Parkinson's disease), and dementia associated with behavioural and psychiatric symptoms
b.	Mild cognitive impairment
c.	Delirium
d.	Amnesic syndrome
e.	Other specific cognitive syndromes
2.	Movement disorders
a.	Drug-induced movement disorders, eg tardive dyskinesia, tardive dystonia, drug-induced parkinsonism, akathisia, neuroleptic malignant syndrome
b.	TS-associated neuropsychiatric disorders
c.	Psychiatric manifestations of other movement disorders (Parkinson's disease, idiopathic dystonia, Huntington's disease, etc)
3.	Psychiatric and behavioural concomitants of neurologic disorders
a.	Epilepsy
b.	Cerebrovascular disease (stroke, transient ischemic attack)
c.	Head injury
d.	Brain tumors
e.	Demyelinating diseases
f.	Other neurologic disorders, eg encephalitis, meningitis
4.	Disorders of attention and impulsivity
a.	Attention deficit hyperactivity disorder
b.	Impulse control disorders, especially intermittent explosive disorder
5.	Neuropsychiatric disorders related to substance abuse and dependence
a.	Substance intoxication and withdrawal
b.	Substance-induced secondary mental syndromes
6.	Chronic fatigue syndrome and psychoneuroimmunology
7.	Neurodevelopment disorders
a.	Mental retardation
b.	Learning disorders
c.	Motor skill disorder
d.	Communication disorders
e.	Pervasive developmental disorders
B. Neuropsychiatric treatments	
1.	Electroconvulsive therapy
2.	TMS
3.	Vagus nerve stimulation
4.	Deep brain stimulation
5.	Neurosurgery for psychiatric disorders
6.	Newer, experimental treatments, eg stem cell therapy, gene therapy, brain implants
7.	Neurorehabilitation
C. Specialized neuropsychiatric investigations	
1.	EEG, including event-related potentials
2.	Intensive neurodiagnostic (video EEG) monitoring
3.	Neuroimaging, using computed tomography, MRI, single-photon emission computed tomography, positron emission tomography and other technologies.

them. However, dementia and mild cognitive impairment are possibly too common for the small number of neuropsychiatrists to take on this mantle. The assessment and management of young-onset dementia is a currently neglected aspect of dementia that falls distinctly within the purview of neuropsychiatry. It is a field that neuropsychiatry can easily claim and develop to make a major contribution to the welfare of this relatively neglected group. Similarly, the management of psychiatric and behavioural symptoms of dementia is a neuropsychiatric problem. Such arguments can be presented for the other disorders listed in Table 1, and neuropsychiatric expertise is likely to vary from one center to another, determining the particular focus of any clinical facility. Together, these disorders comprise a body of clinical work that can underpin a robust discipline. Some neuropsychiatrists place territorial claims on schizophrenia and bipolar disorder, citing the studies supporting their biological basis. This is, in my opinion, an erroneous inference as the mere fact of a biological aetiology does not place a disorder outside the domain of psychiatry. Neuropsychiatry will have a prominent role in some specialized investigations and treatments of these disorders, such as drug-induced movement disorders, secondary schizophrenia or particular physical treatments [eg transcranial magnetic stimulation (TMS) for auditory hallucinations], but their home is likely to remain in psychiatry.

The neurodevelopmental disorders, which include various syndromes associated with intellectual handicap, are neuropsychiatric disorders that warrant a pediatric subdivision of the discipline. Pediatric neuropsychiatry also has interest in learning and communication disorders, pervasive developmental disorders, TS and epilepsy. Moreover, upon graduating into adulthood, these patients have no particular discipline to turn to. Neuropsychiatry can fill this void. Cognitive neuropsychiatry has already grown to become a specialized field, which is a 'systematic and theoretically driven approach to explain clinical psychopathologies in terms of deficits to normal cognitive mechanisms' (8, p. 655)

The clinical territory of neuropsychiatry should extend to some treatments that are physical in nature and require expertise across disciplines. There is major interest in the development of new physical treatments in psychiatry (9). The modern practice of electroconvulsive therapy uses skill in psychiatric treatment and electroencephalography (EEG), and is a prominent neuropsychiatric treatment. For many decades, psychiatric neurosurgery

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formed a major component of neuropsychiatric practice in Australia, the United States, the United Kingdom and some other European countries (10). With its decline, there are novel treatments promising to supplant it. TMS has already established itself as an experimental tool in neuropsychology and has made inroads into clinical practice as a neuropsychiatric treatment (11). Vagus nerve stimulation shows early promise as a treatment for refractory depression (12), and deep brain stimulation is now being investigated in depression (13) and obsessive-compulsive disorder (14). Other psychiatric treatments in the future, such as gene therapy, use of stem cells and brain implants, are likely to involve direct brain intervention and may be regarded as neuropsychiatric in nature. The neuropsychiatrists of the future will, therefore, be well served if they develop expertise in the existing and future techniques that are of potential use as treatments for psychiatric disorders. As a corollary, neuropsychological counseling and cognitive rehabilitation are nonbiological treatment modalities that neuropsychiatry should embrace. This field has yet to blossom, but it is self-evident that the current rehabilitative and counseling services will be inadequate if and when it does.

The neuropsychiatric investigation of patients relies on new technologies in neuroimaging and neurophysiology. There have been rapid advances in magnetic resonance imaging (MRI), for example, which have taken it beyond the simple investigation of brain morphology. Diffusion-weighted imaging, diffusion tensor imaging and exogenous contrast tracking or arterial spin labeling have greatly enhanced the potential as well as the complexity of imaging. Magnetic resonance spectroscopy is able to perform a limited chemical 'biopsy' of the living brain. Functional MRI has joined forces with positron emission and single-photon emission tomography in examining the brain in action. The optimal use of these technologies to investigate neuropsychiatric disorders warrants a level of expertise that neuropsychiatric training is able to provide.

A secure agenda for neuropsychiatric services?

A clinical agenda for neuropsychiatry will only be consolidated if it is accompanied by the provision of appropriate services. Models for specialist neuropsychiatric services have not been developed in general. A proposed principle is to make neuropsychiatry a tertiary-level service with referral

from psychiatry, neurology, geriatrics and general medicine. The nature of the expertise required makes it necessary that the core services for neuropsychiatric diagnosis and assessment develop in academic centers that have access to high-quality neuroimaging and neurophysiology, and the backup of other specialties for their input. Since many neuropsychiatric patients need medium- and long-term hospitalization for cognitive therapy or rehabilitation, the assessment services will need the support of medium- and long-term beds with appropriate models of care. These medium-term units could be geographically distributed and be located at some distance from the tertiary facility. Practical models for such services are urgently needed, and these will vary in detail from region to region depending on local imperatives. A services agenda will also help attract funding from service providers and will assist the training of other neuropsychiatrists.

A secure agenda for training?

The future of a profession is secured by the quality of training of its newest members and therefore neuropsychiatry must develop a training agenda. Training requirements, like those for services, have regional disparities, but a core curriculum would have wide application. The International Neuropsychiatric Association has recently developed such a curriculum (www.inawebsite.org), which needs to be tested for its practicality in different settings. The American Neuropsychiatric Association recently published a curriculum for training in behavioural neurology and neuropsychiatry (15), leading to certification in this superspecialty, and the British Neuropsychiatric Association has prepared its own curriculum.

The necessary components of neuropsychiatric training are being worked out in different settings, and some degree of variability is inevitable. The proportion of psychiatric, neurological and specialist neuropsychiatric training that should comprise the overall training has been debated. One model is to require at least 2 years of core psychiatric training and 1 year of neurological training, followed by 2 years of training in a specialist neuropsychiatric center. The levels of skills required in clinical diagnosis, neuroimaging, clinical neurophysiology, interpretation of neuropsychological investigations and use of newer physical treatments can only be achieved through a prolonged apprenticeship in a specialist center. An accreditation process, with an examination to assess knowledge and skills, is necessary

to ensure the highest standards. It is also important to include research training as a major component of the overall training, with the expectation of a dissertation or a peer-reviewed publication.

A secure agenda for research?

Neuropsychiatry is a frontier discipline with its application of the latest neuroscientific knowledge to clinical medicine. Its research agenda should reflect such cutting-edge discovery and translational work. The clinical territory described above will determine the broad research agenda. Collaboration with the disciplines of psychiatry and neurology is inevitable and indeed desirable. This should not be seen as threatening since neuropsychiatry cannot afford to be isolationist. To go beyond the reaches of traditional psychiatry and neurology, neuropsychiatry should establish collaborations with neuropsychology, genetics, psychopharmacology, diagnostic radiology, immunology, neurophysiology, neurorehabilitation and many other disciplines. It should exploit the insights from developmental neurobiology and neurogenetics to develop novel treatments. The rapid advances in neuroscience make the possibilities limitless.

Conclusion

After a prolonged incubation, the time is ripe for neuropsychiatry to establish a strong and mature presence. Developments in technology and neuroscience have created an environment of rapid advancement, which can now be readily exploited by a clinical discipline. The leaders of this field must cement its clinical services, training and research agenda to bring this into fruition. Much of this work has already begun.

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