Neurology in the People’s Republic of China – An Update

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Introduction

The history of Western medicine in China dates back to 1805 when the English physician Dr. Hobson arrived in Canton (now Guangzhou). However, Western diagnosis and treatment of diseases of the nervous system were formally introduced only at the beginning of the Republican era (1911–1949) as part of the missionary project. Paralleling the situation in Europe and the USA, the early history of neurology in China is inseparable from psychiatry since most of the pioneers were practitioners of both specialties. In 1919, a prominent neurologist from Philadelphia, Andrew H. Woods, became the first professor of neurology and psychiatry at Peking Union Medical College, a Rockefeller Foundation-sponsored university that was then the most prestigious medical institution in China. Two years later, Woods became the founding director of the newly established Department of Neurology and Psychiatry at Peking Union Medical College. The first academic society of the specialty, the Chinese Society of Neurology and Psychiatry, was founded in 1931 [1]. However, Western medicine before 1949 was largely confined to missionary enterprise and to an extremely small...
group of Chinese physicians who had received Western medical education. Neurology was only taught in 12 of the 27 medical colleges and there were no more than 30 neurologists throughout the country [2].

In the years after 1949, during the early post-Liberation period, medical education and clinical medicine significantly improved [3] with the assistance of Soviet specialists, but further development was soon stalled by a series of political campaigns. When the political turmoil reached its peak in the Cultural Revolution (1966–1976), medical education and academic research mostly ceased to exist. Clinical services were maintained only with great difficulty. The beginning of the reform period in the late 1970s set the stage for yet another massive societal transformation, leading to recovery and steady development of the medical profession ever since. Where Tower and Feindel [4] in 1979 counted around 2,000 physicians practicing neurology in all of China (alongside 1,300 neurosurgeons), there are about 15,000 neurologists today [5], as many as in the USA but for a population approaching five times its size [6].

Medical Education

Like clinical medicine, medical education in China reflects the major political changes of the past century. Three major periods can be distinguished [7]. In the early years of the People’s Republic (1949–1965), the government adopted the Soviet model and set up a medical education system marked by a combination of high-school level vocational training and college-level medical education [8]. With the onset of the Cultural Revolution (1966), Chinese society entered a decade of mass upheaval. All medical universities were closed and most faculty members were ordered to the countryside to work as farmers as part of the re-education ideology. When medical universities reopened in 1970, the curriculum was reduced to 3 years and the quality of education had seriously deteriorated.

The beginning of the Reform period in 1978 saw massive policy changes in order to modernize Chinese society in all areas. Academic exchanges with Western countries increased substantially, and postgraduate and continuing medical education started to improve. The total number of medical school graduates increased year after year, exceeding 500,000 in 2006 [9]. However, widespread disparities in the quality of medical education continue to plague this modernization project. For instance, between rural and large metropolitan universities, the length of medical studies may vary from 3 to 8 years. A related phenomenon well known in other parts of the world is the unwillingness of most medical school graduates to work in rural areas.

In recent years, a Master of Medicine degree, which requires 7 years of study, has gradually become the standard in urban areas. A few most prestigious universities offer a Doctor of Medicine degree that requires 8 years of study and is designed to produce the majority of future biomedical scientists.

Post-graduate training positions in neurology only exist in metropolitan medical centers, and competition is harsh given the limited number of available posts. Absent national standards, specialty training varies significantly between centers. In response, the Ministry of Health has recently implemented experimental nation-wide standards for specialty training in some teaching hospitals [10].

An accreditation system that divides hospitals into three levels was established in 1989 [11]. Level 3 hospitals are tertiary care teaching hospitals with more than 500 beds that account for less than 2% of all 62,000 public medical facilities in China. Level 3 hospitals are required to set up a department of neurology, while this is optional for Level 2 (i.e. community) hospitals. The independent private practice of neurology, or medicine in general, is unknown outside of a few foreign-Chinese joint ventures that provide Western-type medical care to expats and some wealthy Chinese patients.

Traditional Chinese Medicine, Biomedicine, and the Potential for Integration

Discussing traditional Chinese medicine (TCM) in any detail is beyond the scope of this overview. However, TCM is worth mentioning here as it continues, at least in its modernized version, to be part of the Chinese medical landscape. However, as is often the case in China, without any official statistics it is difficult to obtain an accurate overview of the extent of the interaction between TCM and Western neurology.

TCM is heavily influenced by the healing traditions of Taoism (道教), one of the three major schools of Chinese religious philosophy. TCM posits that physical and mental health is based on a dynamic, harmonious equilibrium of internal and environmental influences. These include the two polar, complementary forces, yin and yang (阴阳), the Five Phases (wu xing; 五行) and qi (气), the vital force that is both matter and energy (or neither, as
Taoist thought just like quantum physics does not differentiate between the two) and flows through the body's dedicated energy channels (jing; 经). Disease is caused by disruption of the balanced state, either in the form of excess, or deficiency. Treatment is aimed at restoring harmony, rather than the identification and eradication of a single pathogen.

The oldest existing Chinese mention of disorders of the central nervous system, such as stroke and epilepsy appeared in The Yellow Emperor’s Inner Canon (Huangdi Neijing; 黄帝内经). This multi-volume collection of medical tractates comparable to the Hippocratic corpus dates back to the 1st century BCE. The Canon’s treatment prescriptions were based on the principles of rebalancing yin and yang and the Five Phases, and consisted of pharmacetical herbs, acupuncture, massage, and physical and mental ‘self-cultivation’ (yang sheng; 养生).

In the early days of the People’s Republic, clinical medicine was marked by the attempt to integrate Western biomedicine and TCM. Mao was a great admirer of TCM, and ‘Learning from Chinese Medicine’ became one of the guiding principles of public health policies soon after 1949. However, traditional, holistic TCM was incompatible with the dominant positivist philosophy of dialectical materialism and became increasingly marginalized. While this trend continued throughout the first two decades of China’s modernization drive, the last decade has witnessed a remarkable turnaround. One example is the highly publicized and symbolic move of the venerable Shanghai University of Traditional Chinese Medicine to the high-tech ‘Medicine Valley’ of Shanghai-Pudong in 2003. The renewed interest in TCM is in part based on the government’s view that Chinese medicine is inexpensive, compared to technology-driven biomedicine, and may help contain public expenditures. The thrust of the well-funded effort is on one hand to isolate the pharmacodynamically effective compounds of TCM herbal treatments, and on the other hand to study potential synergies between standard medications and adjuvant treatments such as electroacupuncture (thus lowering the cost and improving the side effect profile of ‘Western’ drugs). Unsurprisingly, this pragmatic approach has been criticized by traditional practitioners as being TCM in name only.

The integrated treatment of hepatolenticular degeneration, of particular interest to one of us (X.-P.W.), exemplifies this new wave of TCM and will be discussed at the end of this article.

### Neurology in China Today

The Chinese Medical Association (CMA), established in 1915, currently counts over 430,000 members and 82 specialty societies, and publishes over 70 medical journals. The Society of Neurology became independent of the Society of Neurology and Psychiatry in 1994 and was organized similarly to any US or European professional association. The Chinese Journal of Neurology and Psychiatry, founded in 1955, was split into the Journal of Neurology and the Journal of Psychiatry in 1996. The Neurology Branch of the Chinese Medical Association has set up 13 working groups: (1) Dementia & cognitive disorders; (2) Neurochemistry; (3) Neuropathology; (4) EEG & epilepsy; (5) EMG & clinical neurophysiology; (6) Neurorehabilitation; (7) Neuroimmunology; (8) CSF cytology; (9) Parkinson’s disease & movement disorders; (10) Neuropsychology & behavioral neurology; (11) Cerebrovascular disease; (12) Neuromuscular disease, and (13) Neurogenetics. The Chinese Neuropsychiatric Association, founded in 2007, is still in its beginnings.

The following describes, in large brush strokes, some topics in neurology that have a ‘Chinese face’. More detailed reviews of sister disciplines, e.g. neuropathology [12] and neurosurgery [13], are available.

About 1.5–2 million new strokes occur each year in China [14]. The WHO’s MONICA project found an age-adjusted stroke-attack rate in Beijing of 247 per 100,000 per year for men, and 175 per 100,000 per year for women from 1985 to 1990 [15]. Official statistics in 2006 showed a stroke mortality rate of 116.63 per 100,000 per year in cities, and 111.74 per 100,000 in rural areas [16].

Similar to other developing economies, hypertension remains the most important risk factor [17], making primary prevention a priority. While advanced magnetic resonance imaging and systemic thrombolysis are currently available in most metropolitan medical centers, a rapid-response infrastructure is non-existent, thus limiting therapeutic options [18].

Stroke is the second leading cause of death in the PRC, and as such is a major public health issue [19]. The characteristics of Chinese stroke epidemiology, such as the geographic North-South gradient and the high incidence of hemorrhagic stroke compared to the West were observed early [20, 21].

Myasthenia gravis was first described in China by Hsu and Zheng [22] in 1937. While comprehensive epidemiological studies do not exist, a clinical study in Hubei Province (Central China) showed a male-to-female ratio of 0.8; 50% of the patients were children below 15 years of
In the West, a combination of societal, economic and scientific determinants transformed over the past century, one unified medical approach to diseases of the mind and the brain into two separate ‘specialties’ – psychiatry and neurology. In the process, psychiatry was almost totally de-medicalized, while neurology was de-mentalized. That this artificial split impedes both patient care and scientific progress is increasingly recognized [28].

The reception of the Western concept of neuropsychiatry in China largely reflects these Western trends, with a built-in time-lag. What adds local color is the fact that the Cartesian dualism of spirit/mind versus matter/brain is totally alien to Taoist Chinese culture and to TCM. Also, classic Chinese language has no words (or concepts) for ‘central nervous system’ or ‘psychology’.

An earlier overview entitled ‘Neurology, Neurosurgery and Psychiatry in New China’, published in English in 1965 [29], provides a fascinating glimpse of the specialty on the eve of the Cultural Revolution. Neurasthenia is an important differential diagnosis, along with traumatic brain injury, tumors and the other categories of neurological and neurosurgical disorders. Treatment includes ‘group and individual psychotherapy, physical exercises and labor, acupuncture and breathing exercises’.

At present, ‘neurotic disorders’, i.e. depression and anxiety, as opposed to major mental illness such as schizophrenia relegated to large mental hospitals, are often treated by neurologists, and some divisions of ‘Clinical Psychology’ are staffed by neurologists rather than psychiatrists. This may be in part because general hospital psychiatry is still seriously underdeveloped and the stigma of being in psychiatric treatment is still immense, especially outside large metropolitan areas. Psychotherapy and psychoanalytic education and practice are in a state of flux, and just like during the pre-revolutionary missionary era, under competing, foreign (German, US, French) influences.

While Mainland China has become a major market for the pharmaceutical industry [30], 95% of ‘antidepressant’ medications are prescribed by non-psychiatric physicians in general hospitals. Most of them are neurologists [31].

**Hepatolenticular Degeneration as a Successful Example of the Integration of TCM and Western Medicine**

Hepatolenticular degeneration (HLD) is more common in East Asia than the West. There are about 7,000 patients with Wilson’s disease in China [32].

The defective gene (ATP7B) that causes HLD codes for a putative copper-transporting P-type adenosine triphosphatase. Mutations of ATP7B differ between Chinese and Caucasian populations. While surgical management of late-stage complications of HLD, i.e. orthotopic and live-donor liver transplantation, is available, and gene therapy and stem cell transplantation are being explored [33], integrated TCM and Western medical therapies for Wilson’s disease report success rates as high as 85%. Hepatolenticular degeneration relief decoction (HLDRD, Gan-dou decoction) is a compound recipe of Chinese herbal medicine consisting of *Radix et Rhizoma rhei* 5–10 g, *Rhizoma coptidis* 10 g, *Herba andrographidis* 20 g, *Herba scutellariae barbatae* 20 g and *Rhizoma dioscoreae hypoglaucae* 20 g, boiled twice to a decoction of 500 ml. One treatment cycle consists of twice daily per os administration for 4 weeks. From a TCM perspective, in view of the fact that HLD patients have symptoms such as dry mouth, constipation, red tongue with greasy and/or yellow fur, and ‘slippery-taut’ or ‘quick-taut’ pulse, HLDRD eliminates ‘evil heat’, detoxifies and dredges hollow viscera, and promotes diuresis. From a Western scientific point of view, HLDRD contains not only low levels of copper, but also high amounts of zinc, which inhibits the absorption of copper ions in the gastrointestinal tract and accelerates the excretion of copper. Combined HLDRD and chelation treatment resulted in significant improvement of IQ and extrapyramidal symptoms in HLD patients compared to controls [34].
Conclusion

As part of a larger societal transformation, medicine and neurology in the People's Republic are undergoing rapid change. The size of the population makes necessary public health interventions, such as primary stroke prevention, a massive and urgent undertaking. On the other hand, as in the example of Wilson's disease, large numbers of patients provide neurologists with a unique opportunity to gain mastery in the treatment of rare conditions. Ideally, this expertise will become more accessible to non-Chinese physicians all over the world. Although uncritical assimilation of simplistic readings of Western biomedical models is prevalent, a uniquely Chinese, more thoughtful, integrative approach especially to functional neurology patients is possible and consonant with local medical traditions. For those in the international neurology community who are interested in China, the coming years are a unique opportunity for teaching, as well as for self-reflection and learning from a culture that was for millennia the most advanced civilization on Earth, and is reclaiming that status in the early decades of the 21st century.

References

4. Yamane Y: Medical education in China for non-Chinese physicians all over the world. Although ideally, this expertise will become more accessible to non-Chinese physicians all over the world. Although