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# MRI GUIDED FUNCTIONAL NEUROSURGERY AT L.G.H: THE BEGINNING OF A NEW ERA

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Lahore General Hospital has the credit of being pioneer of "Functional Neurosurgery in Pakistan" when Prof. Bashir Ahmad started the Department of Neurosurgery at LGH in 1966. Prof. Bashir Ahmad, Prof. Nazir Ahmad and Late Prof. Javed Majid Mian had done lot of work and performed Thalamotomies for Parkinsonian tremors. Patients from all over Pakistan and from neighboring countries used to get treatment here. The conventional technique used by above mentioned surgeons was burr hole air/omnipaque ventriculogram based X-rays and calculation of target and production of lesion in the V.P.L thalamus nucleus. CT scan was not used. This was the established method of treatment even internationally in seventies.

Over last two and half decades the treatment for movement disorders has revolutionized globally. Now image acquisition is mostly MRI based (vis-à-vis CT based) and more accurate target defining is done by preoperative fusion imaging and digital brain atlas while target path is determined on Surgiplan Workstation avoiding sulcus, ventricles and internal capsule thus reducing morbidity. No matter what formula you use for the VIM or GPi target, the ultimate accuracy lies in the functional mapping using per-operative microelectrode recording or macro stimulation in awake patient before making permanent lesion using radiofrequency lesion generator or placement of electrodes for Deep Brain Stimulation (DBS). The Department of Neurosurgery at LGH has kept pace with the international standards and a new era in functional neurosurgery at LGH has started since 2012. We are not only doing surgery for tremors and rigidity but also for dystonia, with good results. In future, we plan to start functional surgery for psychiatric problems. We have been successful in procuring state of art equipment in stages and have at the moment 1.5 Tesla MRI scan with a dedicated Functional Surgery Protocol, Surgiplan Work station with facility for image fusion and incorporated Schaltenbrand digital brain atlas. We also have latest Leksell G frame with micro drive for micro stimulation and 3 point adaptor for macro stimulation and target change. Per-operative macro stimulation is done with G4 Cossman radiofrequency lesion generator with whole range of temperature and stimulation variations. The total cost of this equipment excluding MRI is Rs 30 Millions. We have also negotiated special price with Medtronic for bilateral Deep Brain Stimulation (DBS) along with micro-recording apparatus and are offering DBS to affording patients for just USD 20,000 while same treatment costs USD 100,000 in Europe and Singapore. Once DBS becomes a routine, we hope to procure our own micro-recording apparatus which will further bring down the cost. Our poor patients continue to benefit from RF based VIM and GPi lesioning with same equipment for free. Although we have done staged (with 3 month interval) and one stage bilateral GPi pallidotomies with good results, bilateral thalamotomies cannot be offered to patients with bilateral tremors and remains our indication for DBS even in poor patients.

Forty five cases have been operated with this technique by the author at Neurosurgery Unit-III, LGH. In addition Radiofrequency Rhizotomy (RFR) is also being done for trigeminal neuralgia. The definite indications remain patients with atypical facial pain, Multiple Sclerosis, failed MVD and the elderly. However with success of this procedure even younger patients with typical trigeminal neuralgia are opting for this simple and least traumatic option. So far 75 cases have been done in Neurosurgery Unit-III, LGH, Lahore. Following table shows the details of procedures.

<b>Disease</b>	<b>Procedure</b>	<b>No. of Cases</b>
Dystonia	GPI Pallidotomy	11
Rigidity	GPI Pallidotomy	9
Parkinsonian tremors	Vim Thalamotomy	25
Trigeminal neuralgia	RFR	75
<b>Tota</b>		<b>120</b>

GPI: Globus Pallidus interna.  
RFR: Radiofrequency Rhizotomy

VIM: Vento Intermedius

All the centers are requested to refer affording patients for DBS and poor patients for lesioning surgery to our department at LGH.

#### **EDITORIAL COMMENTS:**

MRI Guided Functional Neurosurgery at L.G.H; The beginning of New Era.

**Muhammad Shahzad Shamim**  
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Neurosurgery came to Pakistan in the September of 1951, through a young Omar Vali Jooma; and was formally started in Karachi. Five years later, G. D. Qazi, previously a fully trained general surgeon, also returned from UK and Pakistan's second Neurosurgery center was established at CMH, Lahore. Pakistan's third neurosurgery center was established at Nishtar Medical College and Hospital Multan by Bashir Ahmad in 1963 and remained with Nishtar Medical College for four years before shifting to King Edward Medical College and associated Lahore General Hospital. This was to mark a new era for neurosurgery in the province of Punjab, Pakistan's largest and most populous province. Lahore General Hospital, in years to come was to become one of the busiest neurosurgery centers in the world. Bashir Ahmad's personal interest remained functional neurosurgery and he can easily be called the pioneer of functional neurosurgery in Pakistan. In this issues' editorial, we are delighted to be informed that another functional neurosurgery milestone has been achieved at Bashir Ahmad's institution. Given the circumstances that one has to negotiate in a public sector institution, especially for expensive ailments, the case details are undoubtedly impressive, and encouraging. There is much to do and even though one institution will not be enough for the requirements of the whole country, the following report suggests that despite the overwhelming odds, such an initiative is certainly possible. I congratulate Khalid Mahmood and the administration of LGH and wish them success and prosperity.