

Original Article

MICROVASCULAR SURGERY TRAINING IN NATIONAL INSTITUTE OF BURN AND PLASTIC SURGERY (NIBPS), DMCH.

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Abstract :

Microvascular surgery is a standard procedure in various surgical specialities. For the beginner the logical approach is to start the training with the materials like latex gloves and silastic tube, moving to animal cadaver and finally living animal. In all respect, the training in this particular speciality is costly and facilities are very limited in Bangladesh. Microsurgical training laboratory in National Institute of Burn and Plastic Surgery in Dhaka medical College Hospital conducting courses on Basic and Advanced microsurgery training since July' 2013. In this paper we introduce the importance and low cost opportunity of training, so that skill would be mastered first in the lab and then applied in real life.

Keywords : Microvascular surgery, Basic training, Advanced training, Live animal.

Introduction

Microsurgical procedure is a parameter of excellence for any standard surgery centre. Microvascular surgery is the single most important part in this aspect. Learning curve of microvascular surgery is relatively slow and progressive. As a technical skill, improvement can only be possible by regular practice and this can only be possible in laboratory where simulated environment is present. In these days, the importance and popularity of simulated training is increasing. The cost of basic setup (microscope, micro instrument

and finer sutures etc) is high as well as the maintenance and replacement cost. All these become a considerable factor while establishing a training centre in resource deficient countries like Bangladesh. But if anybody considers the extent of arena of microsurgery (not only limited to microvascular surgery), the need of such training centre is time demanding. The basic principles of microsurgery can be utilized by specialist of Orthopedic, Maxillofacial, Otorhinolaryngology, Pediatric surgery, Ophthalmology, Neurosurgery, Transplant surgery etc. Even a general surgeon need, sometimes microsurgical techniques to perform bilio-digestive anastomosis, bile duct anastomosis or uncomplicated vascular reconstruction¹. The microvascular training also improves the outcome of conventional surgery, once one have the training of handling the delicate structure. In many centers, microvascular procedure is not the last or final choice in the reconstructive ladder.

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Received: 29 April 2015

Accepted 17 May 2015

Due to increase in trauma related incidence, early intervention not only reduces the hospital stay and expenses, but also markedly improves the recovery and limits disability. The importance of trained microvascular specialist in emergency or casualty operating room is essential for a good centre specially in situations, such as traumatic amputation, where time available for successful replantation is short and transport to a distant reference centre is not feasible.

Training in such a high specialized field for the beginners poses various challenge. One of the main obstacle for training in microsurgery is the cost and consequently which limit the number of facilitated centre. Together with this, patience and endeavor of the trainee is important aspect of mastering the skill of microvascular surgery.

Bangladesh is a developing country where most of the medical and surgical specialized training facilities are available in government institutes. National Institute of Burn and Plastic Surgery (NIBPS) of Dhaka Medical College Hospital is the pioneer centre for microvascular training in Bangladesh. This centre is conducting regular courses on basic microsurgery and advanced microvascular surgery since July, 2013. Some surgical societies like Neurosurgery, Hand surgery, Maxillofacial, ENT are showing interest and attending in this training program.

Microvascular training course

The acquisition of competence in microvascular surgery is a prolonged endeavor of practice, dedication and long presence for lab practice. Mastering the skill involves steep competency learning curve on which the clinical outcome greatly depends². Even a skillful surgeon is not able to perform microsurgery without specialized training.

In our centre (NIBPS) the training course includes theoretical and practical lesson and divided into two parts – Basic and Advanced, two days for each part and 6 hours each day. Independent of surgical speciality of the trainee, it is essential to learn basic techniques of microsurgery in low fidelity models (latex gloves and animal cadaver). The two day basic course begins with theory session which last for one hour

each day addressing question on handling and adjusting microscope and loupe, demonstration and handling micro-instruments and sutures, techniques of fine dissection and vascular anastomosis. To ensure better learning, during hand-on-training session, there is one instructor for each 4 trainee. For the beginner, after the first working hour with a microscope, it is common the occurrence of headache, muscle pain and loss of concentration³. Besides that, detailed information and tricks of microvascular procedures are too much for being learning in short duration. So we allow the trainee who already completed the microsurgery course to practice individually in lab. In a survey done in USA, 81% microsurgical based training courses have 40 hours duration divided in 10 days⁴.

In our training, we use 8-0 to 10-0 Nylon suture to practice stitching on latex gloves at different magnification and different hand position in the first day. The levels of difficulty of exercises are progressive to assure better adaptation with the microscope, instruments and suture. In the second day of basic training, after initial demonstration of one hour, trainee are asked to practice dissection, end-to-end and end-to-side anastomosis of neck arteries of cadaver goat, the structure of which is different from latex but similar consistency with biologic tissue. Basic training does not mean that after 2 weeks training in the lab, the trainee will be opt to perform in the clinical setting⁵.

After learning the basic techniques, trainee is allowed for the advanced course with high fidelity model which in our centre is live chicken (where Rodents are used in most centers in USA, Brazil, Europe, India)⁶. In the advanced course of NIBPS (Figure-1), two hours demonstration in the first day includes anesthesia of chicken, detailed dissection, and arterial end-to-end anastomosis.

Chicken are readily available than rodent, cheap and harmless. Structures, particularly artery are of considerable size for the beginner and chicken size can be selected according to the efficiency of the trainee. Selected femoral artery at thigh have less branches and long enough to perform the end-to-end anastomosis (Figure-2) without need of ligation of side branch.



Fig.-1: Photograph of advanced course in NIBPS, DMCH

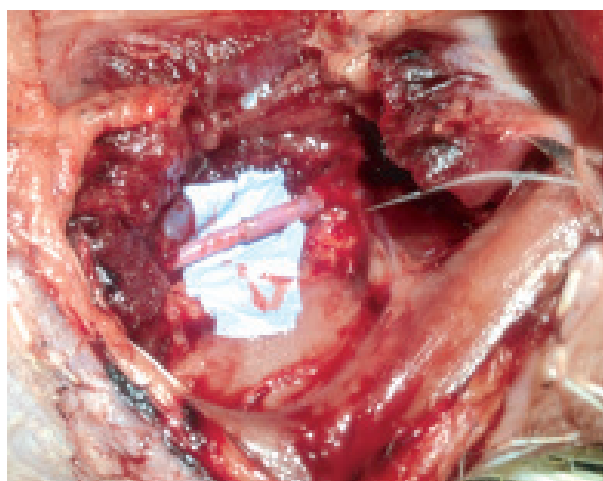


Fig.-2: Femoral artery after end-to-end anastomosis

Femoral vein at this level can also be selected for anastomosis for more experienced trainee. All four limbs of the chicken can be used to optimize the use of living animal before sacrificing it. (Figure-3)



Fig.-3 : Dissection and skeletalization of femoral neurovascular bundle in live chicken (both side).

As because the failure in microvascular surgery is not reparable and consequences are grave⁶, it is strongly recommended that a trainee performing microvascular anastomosis in a patient should be under direct supervision and only after obtaining a success rate (standardized by individual centre) on a vessel of similar caliber in the laboratory .

Besides meticulous technical quality, the time required to perform the anastomosis need to be considered, because ischemia/reperfusion injury adversely affects the outcome, proportionate to the lapse of time before and during surgery.

Conclusion

It is clear that the learning process is faster and better when the training is intensive and continuous instead of doing sporadically over a long period. Not every microsurgical trainee will become a successful microsurgeon, mostly because of impatience, in-coordination, temper and tremor. The time in the lab is important to correct these problems or to understand by the trainee that it is not his or her domain. Even for a competent surgeon, continuity is essential, not only to keep manual ability but also to learn and develop new techniques. Microsurgical training lab in National Institute of Burn and Plastic Surgery in Dhaka Medical College Hospital is a good centre for learning and practicing microvascular anastomosis within limited resource and expenditure.

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