https://doi.org/10.29309/TPMJ/2024.31.02.8042

The Professional Medical Journal
www.theprofesional.com
2024, Volume, 31 Issue, 02

SHORT COMMUNICATION

Cardiac wet lab by residents with limited resources in newly established cardiac center: Need of the hour.

Abdul Nasir[1], **Aamir Iqbal**[2]

Article Citation: Nasir A, Iqbal A. Cardiac wet lab by residents with limited resources in newly established cardiac center: Need of the hour. Professional Med J 2024; 31(02):315-317. https://doi.org/10.29309/TPMJ/2024.31.02.8042

HIGHLIGHTS

- It is possible to establish a wet lab for cardiac surgery training in resource-constrained settings in developing countries.
- Residents can arrange wet lab sessions using their own limited resources.
- This enhances their surgical skills and boosts their confidence in the operating room.
- Faculty can provide supervision and feedback without any concern about harming patients.

Key words: Cardiac Training, Coronary Anastomosis, Cardiac Simulators, Wet Lab.

INTRODUCTION

Surgical mentors are reevaluating their teaching methods for surgical skills due to various factors such as patient safety concerns, financial constraints, and restrictions on resident work hours. These issues in surgical training have prompted the need for more effective approaches.[1-2] The current method of training in cardiac surgery involves residents being exposed to surgical procedures under the direct supervision of consultants. However, Cardiac surgery being time sensitive, having no margin of error, this method is very challenging and make long learning curve for residents and potentially dangerous for the safety of the patient.[3]

According to studies, contemporary advancements such as wet labs, dry labs, and simulators have demonstrated improved performance and superior outcomes.[4] In developed world Simulators is offering a training experience that is both realistic and progressively challenging, while also aligning with valid educational goals and objectives. This enables trainees to practice at their own convenience, without being restricted by work hour constraints or the availability of animal laboratory facilities. Fann and colleagues explored the utilization of porcine hearts in resident training, assessing the performance of cardiothoracic surgery residents after one week of practice on task stations and a beating heart simulator. Their findings indicated a significant reduction of approximately 20% in the time it took residents to perform anastomosis on task stations and a 15% decrease in time on beating heart simulators. This underscores the importance of practicing surgical skills outside of the operating room, demonstrating that it is a valuable, safe, and effective approach for enhancing the skills of cardiothoracic surgery residents.[5] Similarly Alwadani and colleagues suggest that goat's eyes are an ideal choice for ophthalmological wet labs. They highlight wet labs as an effective method to empower trainee surgeons, enabling them to safely perform complex procedures with reduced complication

1. MBBS, FRCS, Assistant Professor Cardiac Surgery, Peshawar Institute of Cardiology, Peshawar.
2. MBBS, Resident Cardiac Surgery, Peshawar Institute of Cardiology, Peshawar.

Correspondence Address:
Dr. Aamir Iqbal
5-A, Sector B-3, Phase-V,
Hayatabad, Peshawar, Pakistan.
aamirhealthonline@gmail.com

Article received on: 10/10/2023
Accepted for publication: 16/12/2023

rates and accelerated learning curves.[7]

Wet labs that utilize animal organs provide crucial training opportunities and allow for practice outside of the operating theater.[6] Bovine and swine tissues are the most frequently used animal organs for teaching in wet labs in some labs sheep and dogs are also employed as teaching materials for wet lab purposes. In the wet lab, each participant receives a unique learning experience, the opportunity to acquire fundamental surgical skills and techniques. It provides unique interaction between resident and consultant to perform different complex surgeries under relaxed environment with no fear of error and resident performance is monitored hence decreasing learning curve.[8]

Arranging costly cardiac simulators and well-equipped wet lab session for residents is big challenge for resource depleted under developed countries specially in new cardiac centers and no such organized cardiac simulator center established in developing countries is reported yet. This need arises because resident training with real patients is time-consuming and carries inherent risks to the patients involved. Therefore, wet labs offer a valuable alternative for training residents, enabling them to develop skills that are beneficial in the operating room. The purpose of this document is to provides an in-depth discussion of the technical aspects of a wet lab, highlighting its advantages, the requirements involved, and the procedural steps for its implementation within limited resources by the residents.

MATERIAL & METHODS

Residents of department of cardiac surgery Peshawar institute of cardiology started monthly wet lab sessions and conducted sessions on coronary anastomosis, basic cardiac stitching, instruments handling all of whom had completed general surgical residency training. Each wet lab session commenced with a presentation by a faculty member on the designated topic, aimed at providing foundational knowledge. Resident queries were addressed during this session, and the faculty member also conducted assessments to ensure that residents had a comprehensive understanding of the topic (Figure-1). Several stations were established, each allocated to an individual consultant, and residents were divided among these stations for one-on-one instruction and teaching by the respective consultant.

Figure-1. Presentation on the topic moderated by consultant

2.1 Wet Lab Setting

Old sutures which were left over in OR was collected. We utilize preserved veins stored in formalin from our coronary artery bypass surgeries and stored in refrigerator. Defective instruments that were not previously used were repaired, and distinct instrument sets were assembled for each station. Unused drapes from the operating room were stored and repurposed to cover the patient shifting trolley, effectively serving as a makeshift table for the wet lab station. Bovine hearts were bought from local butchers with very low cost of just few hundred Pakistani rupees. The heart was positioned to expose the left anterior descending artery (Figure-2).

Figure-2. Basic cardiac wet lab station set-up.

2.2 Performance Assessment

Each resident received supervision and hands-on training in instrument handling, grafting

procedures, suturing techniques, and surgical orientation at designated stations. Subsequently, they were given the opportunity to independently perform these tasks under continuous monitoring by a faculty cardiac surgeon, who provided ongoing feedback to help correct any mistakes (Figure-3). Following the completion of the anastomoses or valve procedures, the moderator conducts inspections, providing further feedback to both the resident and the faculty member who supervised that specific resident during the procedure.

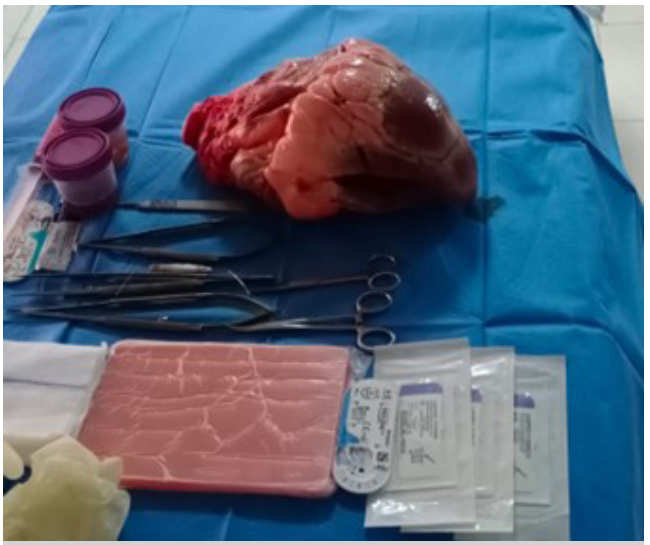

Figure 3. Resident performing anastomosis under direct supervision of consultant

CONCLUSION

Wet labs are highly effective for learning, particularly in the context of cardiac surgery. They are often conducted with the aid of simulations and state-of-the-art facilities. In many third-world countries where cost is a significant concern, it is possible to establish a basic wet lab at an extremely low cost, using the limited resources available. This can be especially beneficial for residents in new cardiac centers, as it helps boost their confidence, enhance their surgical skills, and shorten their long learning curve in the field of cardiac surgery.

REFERENCES

1. Reznick RK, MacRae H. **Teaching surgical skills—changes in the wind.** New England Journal of Medicine. 2006 Dec 21; 355(25):2664-9.

2. Grober ED, Hamstra SJ, Wanzel KR, Reznick RK, Matsumoto ED, Sidhu RS, et al. **The educational impact of bench model fidelity on the acquisition of technical skill.** Ann Surg. 2004; 240:374-81.

3. Inam H, Asif N, Sohail AA, Fatimi SH. **Wet labs: A useful tool in training surgical residents in a third world country.** Annals of Medicine and Surgery. 2020 Sep 1; 57:137-9.

4. Barry Issenberg S, Mcgaghie WC, Petrusa ER, Lee Gordon D, Scalese RJ. **Features and uses of high-fidelity medical simulations that lead to effective learning: A BEME systematic review.** Medical Teacher. 2005 Jan 1; 27(1):10-28.

5. Fann JI, Caffarelli AD, Georgette G, Howard SK, Gaba DM, Youngblood P, Mitchell RS, Burdon TA. **Improvement in coronary anastomosis with cardiac surgery simulation.** The Journal of Thoracic and Cardiovascular Surgery. 2008 Dec 1; 136(6):1486-91.

6. Alwadani S. **Cataract surgery training using surgical simulators and wet-labs: Course description and literature review.** Saudi Journal of Ophthalmology. 2018 Oct 1; 32(4):324-

7. Solomon B, Bizekis C, Dellis SL, Donington JS, Oliker A, Balsam LB, Zervos M, Galloway AC, Pass H, Grossi EA. **Simulating video-assisted thoracoscopic lobectomy: A virtual reality cognitive task simulation. The Journal of thoracic and cardiovascular surgery.** 2011 Jan 1; 141(1):249-55.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Abdul Nasir	Substantial contributions to the conception or design of the work, or the acquisition, analysis, or interpretation of data for the work.	
2	Aamir Iqbal	Drafting the work or revising it critically for important intellectual content.	