



Internal Iliac Artery Ligation: Experience of Self-learning by Cadaveric Dissection

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ABSTRACT

Post-partum hemorrhage is one of the commonest causes of maternal morbidity as well as mortality in majority of the developing countries even today. Failure of intervention by medications requires surgical intervention. Ligation of anterior division of internal iliac artery is life saving, uterus preserving surgery, and expertise at it can reduce obstetric hysterectomies. To visualize anterior division of internal iliac artery in cadavers and to plan out further steps for training of post graduate students. Dissection was carried out in 5 cadavers, reaching internal iliac artery and passing silk suture beneath the same, before its bifurcation. The average time taken for reaching internal iliac artery from putting an incision on skin to the artery was 15 minutes. Ligation of anterior division of internal iliac artery is a life saving procedure, preserving fertility as well. Training post graduate students for the same would require cadaveric dissection as first step, which can be followed by assisting senior consultants while performing the procedure in emergencies. Cadaveric dissection for internal iliac artery is a skill enhancing, confidence enriching step as a part of the training, which can be further enhanced by assisting live surgeries, producing more competent obstetricians and surgeons, which in turn may reduce maternal morbidity and mortality.

Keywords: Internal Iliac Artery Ligation, Postpartum Hemorrhage, Cadaver, Obstetric Hysterectomy

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INTRODUCTION

PPH (Postpartum Hemorrhage) is one of the most common reasons for maternal mortality, constituting almost a quarter of total deaths globally [1]. In cases of PPH, at many occasions, skill & expertise of gynecologists/surgeons at Internal Iliac Ligation can preserve uterus [2]. Internal iliac artery ligation effectively reduces pulse pressure by almost 70-80% [3]. Obstetric

hysterectomy is rising with rising incidences of cesarean section & consequent rise in incidences of placenta previa, adherent placenta. Removing uterus also has its consequences; it not only ends the obstetric career of the patient, the ovarian functions decline and stops after 2 years of removing uterus leading to premature menopause.

Visualization of internal iliac artery in cadavers is supposed to increase the confidence of the performing surgeon/gynecologist, who can be later on taught the dissection during live surgery in a vitally stable patient. Such workshop on

cadavers along with pre-test and post-test questionnaire has found to be successful in increasing skill, knowledge and confidence of the resident doctors [4]. Cadaver is considered as one of the most useful tools for learning anatomy, even in current digital and 3D printing era [5].

Ideal surgery is to be performed in a well-equipped hospital with all facilities of anesthesia and a surgeon competent and well trained not only to perform procedure but also well trained in managing complications of the procedure.

In our goal to increase competency of the surgeon to treat PPH carefully and effectively, we have sought the way of getting trained in the internal iliac artery ligation by

1. Live during cesarean section
2. During abdominal hysterectomy, after vault closure
3. Cadaveric dissection
4. Computerized 3 D simulation

In a live surgery, visualization of internal iliac artery will increase the confidence & skill at reaching to the artery, which can be done via transperitoneal approach, the fastest approach or it can be done by retroperitoneal approach. The best time can be in a cesarean section patient, after uterine closure. It does not need any extension of anesthesia. The safety measures including Bulldog clamp, prolene 6-0 suture need to be kept ready.

Aims & Objectives

Internal Iliac Artery Ligation is a lifesaving procedure, preserving uterus, and in turn fertility as well! The study mainly focuses on

- To visualize anterior division of internal iliac artery in cadavers
- To plan out further steps for training of post graduate students for enhancing their knowledge, skills and confidence by arranging workshops on cadaveric dissection as future steps
- To identify the requirements for training Post Graduate students, i.e. permission, theory, practical demonstration

MATERIALS AND METHODS

There are various ways of improving skill for internal iliac artery ligation. First being, cadaveric dissection, second being in abdominal

hysterectomy patients after vaginal vault closure, and third being, in vitally stable cesarean section patient after uterine closure.

In our study, cadaveric dissection was done on 5 cadavers to demonstrate internal iliac artery. Abdomen was opened; uterus was identified and pushed anteriorly. Bowels were retracted with Deaver's retractor and packed with wet mop. Fine dissection was done to visualize internal iliac artery on left side, via retro-peritoneal approach. The posterior division was identified just after the bifurcation of common iliac artery. Anterior division was located, internal iliac vein was also located beneath the anterior division. The same procedure was used on right side to visualize right internal iliac artery.

RESULTS

This prospective study was conducted on 5 female cadavers. As in all five cases, the uterus was small and in true pelvis, the approach for reaching internal iliac artery was retroperitoneal. Bowels were retracted to the midline; bifurcation of common iliac artery was located. Ureter was identified and anterior division of internal iliac artery was made clear by dissecting soft tissues around it. Silk suture was passed by using mixtur artery forceps going beneath the internal iliac artery, before its bifurcation and lifted anteriorly so as to make anatomy of the said artery clear. (Figure 1, 2) The average time taken to reach the artery was approximately 15 minutes.



Figure 1: Internal iliac artery isolated and demarcated by silk suture

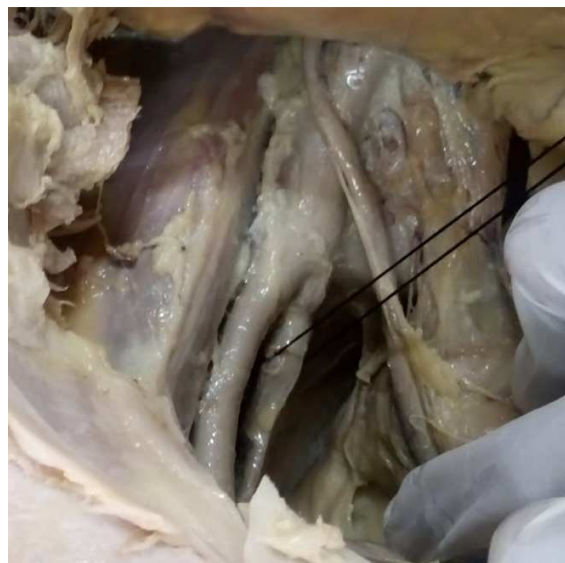


Figure 2: Internal iliac artery isolated by silk suture passing beneath it

The visualization in cadavers made the anatomy and required skill clearer. The study can be taken to next level by involving Post Graduate residents in training workshop on cadavers with pre-workshop and post-workshop evaluation.

DISCUSSION

Post-partum hemorrhage has been the commonest cause of maternal mortality all across the globe. Failure of all the medical and compression sutures, ligation of anterior division of internal iliac artery remains an important life-saving, uterus-preserving step. Expertise at it can significantly reduce morbidity as well as mortality. Internal iliac artery ligation is not associated with secondary infertility or fetal anomalies [6, 7].

Time in taking decision for a surgical intervention is crucial in outcome [8]. Though in our study, abdomen was opened to reach the artery, average time was 15 minutes, but in live surgery, the abdomen is usually already open, so the wastage of time in crucial situation is not there, and expertise at dissecting and ligating artery would be of paramount importance. Internal iliac artery ligation in comparison to obstetric hysterectomy, required lesser time [9].

A live surgery is a very difficult setup to initiate teaching with, as it is done very quickly so as to

improve the outcome. Training can be given to post graduate residents under guidance of senior and experienced Obstetricians and surgeons firstly on cadavers, and then in form of assistance in live surgeries.

Increasing skill at visualization of the artery in cadavers will increase the knowledge of anatomy along with increasing confidence and skill of operating surgeons, making them ready for live dissection. It consolidates the anatomy of surrounding structures as well so as to avoid inadvertent injuries while ligating internal iliac artery. The philosophy of self-learning has developed since the 1970s and early 1980s and has become one of the main features in education in the late 20th and early 21st century. Self-learning has different terms including self-directed learning and self-access learning [10]. Persons with learning goal orientation seek to increase the sense of self efficacy or self judgement by attaining competence in selected task. It has been proved that learners having learning goal orientation do express greater use of metacognition and effective learning strategies [11].

Training on cadavers has few benefits. It is less stressful, in comparison to live surgery, and even if there is any inadvertent injury to surrounding structure, it doesn't lead to any complication.

The study was supposed to be conducted during live surgery, during cesarean section, but Institutional Review Board of our institution suggested it to be done on cadavers as the first step, so as to get proper training.

CONCLUSION

Cadaveric dissection to visualize internal iliac artery was proved to be skill and confidence enhancing step, which can be implemented in form of short workshop courses to improve the quality of medical service to the society, by producing more competent and skillful Obstetricians and surgeons. Bringing down maternal mortality and morbidity drastically would soon be possible by such a vision. 3 Dimensional simulations would be of great help in such trainings, but its unavailability makes it difficult to train the residents as well as the junior consultants.

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