ORIGINAL ARTICLE

Improving Medical Student Knowledge of Serous Membrane Anatomy by Animal Dissection

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Received: September 15, 2014
Accepted: December 12, 2014

Background: Understanding some part of the human body such as serous membrane, peritoneal cavity, lesser sac and proper mesentery is difficult for medical students. The objective of this study was to determine the effect of animal dissection on improving medical student knowledge and view related viscera and serous membrane anatomy.

Methods: In YUMS in 2011, sixty eight medical students were randomized to the animal dissection and usual teaching (group I) vs usual teaching alone (Group II) in thoracic anatomy. In abdominal part the position changed for both groups and in pelvis anatomy all student access to the both usual teaching and animal dissection. Post intervention knowledge and attitude questionnaires were completed. Independent t-test was used to analysis the data.

Results: The group I had significant increase and decreased knowledge in thoracic and abdominal anatomy, respectively (15.8±3.1 and 15.1±1.4) in compare with the group II (14.1±1.1 and 16.1±1.4) ($P<0.01$). The result of exam in pelvic anatomy for group I (17.7±1.2) comparing to the group II (17.4± 1.8) was not significant ($P=0.43$). The result of the questionnaire demonstrated, 82% of the students believed that these methods could cover enough of serous anatomy knowledge and 96% stated that they understood the anatomy of the serous membrane and viscera. Also, 90% perceived that this method can create better situation for communication and help to the other medical students.

Conclusions: It seems that the dissection of animal is very important in the education of anatomy practical course and could improve medical student knowledge and attitudes.

Keywords: Anatomy; Animal; Attitude; Dissection; Education; Serous Membrane

تحسين تعليم علم التشريح في مجال الأغشيه باستعمال تشريح الحيوانات

التمهيد و الهدف: إن فهم بعض مجالات علم التشريح مثل انواع الأغشيه والحفرات في جسم الانسان قديكون صعبا في التعليم الطبي .

في هذه الدراسه تم تحليل مستوى تأثيراستخدام الحيوانات في التشريح على نتيجه استيعاب الطالب عند طلاب الطب.

المواد والاساليب: في جامعه ياسوج للعلوم الطبيه في عام ١٣٩٠ ه.ش تم اختيار ٦٨ طالب بشكل عشوايي و تم تقيسمهم الى فريقين : الفريق الاول في مجال دراسه القفص الصدري استخدم الدراسه الاعتياديه الى جانب تشريح الحيوانات و اما الفريق الثاني استخدم فقط الدراسه الاعتياديه . و في مجال البطن تم تبديل المجموعات . و في الحوض استخدم المجموعتين الاسلوبين معا . و بعد ذلك تم استخدام استمارات و امتحانات لمعرفة النتائج و تم استخدام الاختبار الإحصائي تي المستقل لتحليل المعطيات .

النتائج: المعرفه التشريحيه في الفريق الاول في القفص الصدري و البطن (١٥,١±١,٤ , ١٥,٨±٣,١) مقارنة مع الفريق الثاني (١٦,١±١,٤ , ١٤,١±١,١) كان هناك اختلاف يعتنى به اكثر واقل ($P<0.01$) . نتيجه اختبار الحوض في الفريق الاول (١٧,٧±١,٢) مقارنة مع الفريق الثاني (١٧,٤±١,٨) لم يكن ذوقيمه ($p=0.43$). اشارت نتايج الإستمارات الى أن ٨٢٪ من الطلاب يعتقدون أن الاسلوب الجديد جيد و ٩٦٪ اكتسبوا هذا العلم . و اعتقد ٩٠٪ منهم ان هذا الاسلوب يساعد على تحسين الارتباط العلمي بين الطلاب .

الاستنتاج: استخدام اسلوب تشريح الحيوانات في مجال تعليم علم التشريح ممتاز و يحسن العلم و الرؤيه عند طلاب الطب.

الكلمات الرئيسيه: التشريح ، الحيوانات ، الرؤيه، التعليم، الأغشيه .

بهبود دانش آناتومی پرده های سروزی با استفاده از تشریح حیوانات

زمینه و هدف: درک آناتومی بعضی قسمتهای بدن انسان از قبیل؛ پرده های سروزی، حفره صفاقی، چادرینه کوچک و روده بند اصلی برای دانشجویان پزشکی دشوار است. در این بررسی تاثیر استفاده از تشریح حیوانات بر روی بهبود دانش آناتومی احشاء و پرده های سروزی در دانشجویان پزشکی مورد بررسی قرار گرفته است.

مواد و روش ها: در دانشگاه علوم پزشکی یاسوج و در سال ۱۳۹۰، ۶۸ دانشجوی پزشکی بطور تصادفی به دو گروه شامل استفاده از تشریح حیوانات وهمراه با آموزش معمولی (گروه اول) و آموزش معمولی (گروه دوم) در بخش قفسه سینه تقسیم شدند. در قسمت شکم جای گروه ها عوض گردید و در ناحیه لگن هر دو گروه به تشریح حیوانات و آموزش معمولی دسترسی داشتند. پس از مداخله، دانش آناتومی با آزمون و با استفاده از پرسشنامه نگرش دانشجویان بررسی گردید. از آزمون آماری تی مستقل جهت تجزیه و تحلیل داده ها استفاده گردید.

یافته ها: دانش آناتومی دانشجویان گروه اول در بخش قفسه سینه و شکم (۱۵/۱±۱/۴ ، ۱۵/۸±۳/۱) در قیاس با گروه دوم (۱۶/۱±۱/۴ ، ۱۴/۱±۱/۱) بطور معنی داری به ترتیب بیشتر و کمتر بود ($P< 0.01$). نتایج آزمون آناتومی لگن در گروه اول (۱۷/۷±۱/۲) در قیاس با گروه دوم (۱۷/۴±۱/۸) معنی دار نبود ($P=0.43$) . نتایج پرسشنامه نشان داد که ۸۲٪ از دانشجویان اعتقاد داشتند که این روش دانش آناتومی پرده های سروزی را پوشش می دهد و ۹۶٪ این دانش را کسب کرده بودند. همچنین، ۹۰٪ دریافتند که این روش برای ارتباط و کمک به دانشجویان دیگر بهتر است.

نتیجه گیری: استفاده از تشریح حیوانات در آموزش دروس عملی آناتومی مهم است و در بهبود دانش و نگرش دانشجویان پزشکی موثر است.

واژگان کلیدی: آناتومی، حیوانات، نگرش، تشریح، آموزش، پرده های سروزی

جانوروں کی تشریح کے ذریعے سیروس جھلیوں کی بہتر شناخت حاصل کرنا۔

بیک گراونڈ: انسانی بدن کے بعض اعضا کی بہتر اینائامی کوبہتر طریقے سے سمجھنا نہایت اہم ہے اور ساتھ ساتھ دشوار بھی ہے ان میں سیروزی پرتیں، پیٹ کے بعض حصے، لیسر سیک وغیرہ شامل ہیں۔

روش: یاسوج میڈیکل یونیورسٹی میں دوہزار دو میں یہ تحقیق انجام دی گئي جس کے لئے اڑ سٹھ طلباء کا انتخاب کیا گیا تھا۔ اس تحقیق میں حیوانات کے بدن کی تشریح کی گئي اور آنتوں اور سیروز ممبرین کے بارے میں معلومات فراہم کی گئیں۔

ان طلباء کو دو گروہوں میں تقسیم کیا گیا پہلے گروہ کو جانوروں کے ڈیسیکشن کے ساتھ عام لکچردیا گیا۔ دوسرے گروہ کو سینے کے اعضا کی تشریح کا کام سپرد گیا گیا لیکن پیٹ کے حصے میں دونوں گروہوں کی ذمہ داریاں بدل دی گئیں پیلویس حصے میں دونوں گروہوں نے جانوروں کی سرجری کی اور لکچر سنا۔ اس کےبعد طلباء کو سوالنامے دئے گئے جن میں اینائامی کے بارے میں سوالات تھے۔ ڈیٹا کا ٹی ٹسٹ سے تجزیہ کیا گیا۔

نتیجے: اس تحقیق سےمعلوم ہوتا ہےکہ جانوروں کی تشریح سے طلباء انسانی اعضا کی اینائامی بہتر طریقے سے سمجھ سکتے ہیں۔ بیاسی فیصد طلباء کا یہ خیال تھا۔ اور نوے فیصد کا کہنا ہے کہ انہیں اس روش سے سیروز ممبرین کا بہتر درک حاصل ہوا ہے اور نوے فیصد کا کہنا ہے کہ اس روش سے طلباء کو بہتر تعلیم دی جاسکتی ہے۔

سفارش: چونکہ جانوروں کی تشریح سے طلباء کو کافی مدد ملتی ہے لھذا اینائامی کی تعلیم کے لئے اس روش کو ضرور اپنایا جائے۔

کلیدی الفاظ: اینائامی، جانور، تشریح، تعلیم سیروز ممبرین ۔

INTRODUCTION

Anatomy of the human body is one of most key course and is an important subject for medical students. Undoubtedly, the use of the cadaver in anatomical institutes is very important practice to improve learning human biology science for medical student (1). It has been documented the cadaver dissection are more important to take the better result than computerized resources in teaching anatomy (2). With increase of medical school in Iran, there is too much limitation for cadaver due to the religion and low numbers of donors, so many anatomical institutes do not have access to the new cadaver for years. Furthermore, dissection of the human body is not only significant for knowledge but also have clearly influence on medical student behaviors and beliefs (3).

Thus, teaching anatomy for medical student is one of the most challenging courses that anatomists face in Iran. Although, the three-dimensional images and interactive software for teaching anatomy are available, it seems that they are not responsive to all the educational needs of medical students. For many parts of the human body such as bones and muscles are anatomical model that could be very helpful to support the student to take the detail of the content. But there is not anatomical model similar to muscle or bone for some part of the body such as serous membrane, peritoneal cavity, lesser sac and proper mesentery. So, the medical student may spent a lot of time but they could not take a three dimensional or true image of organs or serous especially for peritoneal membrane. They do not know the peritoneal membrane which takes the organs, which the nerves and vessels come through from mesa to the viscera. It was needed that some particular structure especially in the abdomen and pelvis training be provided by dissection (4).

Furthermore, it is stated that teaching anatomy by dissection is the major basic of medicine; it is presented in three-dimensional anatomy perception, and its realization in the discoveries (5). Not only dissection improves medical learners in structure and functional of human body but also can affect the psychosocial areas of the whole medical doctors (6-8). Besides, dissection could involve all senses and let the student to practice unpredictable positions (9, 10).

Anatomy of the serous membrane in mammals such as goats, rabbits and mice is very similar to human subjects. Although, it is very easy, cheap and functional to access to some animals such as goat, dog and sheep for dissection, but a precise study has not been performed in our country due to general medical curriculum in order to illustrate the effectiveness of learning anatomy animals.

So, this study was conducted to determine the effect of animal dissection on improving of anatomical knowledge and attitudes of medical students.

METHODS

This Quasi-Experimental study after approval of Research Deputy of Yasuj University of Medical sciences with the permission of Medical faculty in cooperation and informed consent of 68 medical students was conducted in 2011. Sixty eight first-year of medical students from Yasuj university, Iran, were enrolled in this study and randomized to the animal dissection and usual teaching (group I) vs. usual teaching alone (group II) in thoracic anatomy. In abdominal part the position changed for both groups and in pelvis anatomy all student access to the both usual teaching and animal dissection (Table 1).

Each group was divided to subgroups and in the practical class and each subgroup have enough time to learn the detail of the course. Twenty from 51 hours of practical class during the term were considered for animal dissection and 31 reminder hours in both groups were spent on anatomical model, image and computer assisted images. All students enrolled in the course of trunk anatomy participated in this study and were excluded if they did not participate up to the end of semester.

Six mature animals from each specie including goat, sheep and rat were chosen for anatomy practical course including; thorax, abdomen and pelvis (two from each specie for each part). All experiments were performed according to the guidelines of the Iranian Council for the use and care of animal's guidelines and were approved by the Animal Research Ethical Committee of Yasuj Medical University. Before dissection, animals were anesthetized with double dose of Ketamine and Xylazine. Animals were not fixed and group I had access to dissect and palpate the viscera and serous membrane quickly after animal anesthesia. Students' attitude was assessed by a questionnaire that was developed by the investigators of this study. The validity of the questionnaire was confirmed by experts' opinions, and its reliability was measured by Cronbach's alpha. The questionnaire consisted eleven questions in four domain including; content coverage (1 and 7), interaction (4 and 11), learning (2, 3, 8 and 9) and interest (5, 6 and 10). Each question had five Likert scale responses (including 5 score from 1 to 5, Scale: 1, strongly disagree; 5, strongly agree) comprised of different questions such as, dissection of animal covers enough of serous anatomy knowledge. Dissection of animal enhances my understanding of anatomy of the serous membrane and viscera. Dissection of animals enhance my understanding that the vascular how to

Table 1. The position of each group changed in trunk anatomy course.

Groups	Thorax		Abdomen		Pelvis	
Group I	Animal dissection	assessment	Conventional	assessment	Animal dissection	assessment
Group II	Conventional	assessment	Animal dissection	assessment	Animal dissection	assessment

The assessment has done following each part.

transport from the serous membrane to the viscera. Animal dissection is an appropriate manner for more relationship with students and other colleagues. I would prefer to use the animal dissection in the other courses of anatomy such as head and neck and limbs. SPSS software (version 14) was used for analyzing the data. Independent t-test was used to evaluate the animal dissection on students' scores and attitudes.

RESULTS

From October to January, 65 medical student of 68 participated in all part of trunk anatomy courses in 2011. Results of the exams from different part of the trunk anatomy showed the mean scores of the students that practiced with animal dissection significantly improved in compare with the other group ($P<0.01$). Also, Independent t-test demonstrated there was not a significant difference between both group in pelvis anatomy ($P=0.43$) that all students had access to animal dissection and traditional teaching (Table 2). Thus, result of this study demonstrated the animal dissection was useful and supported the anatomical knowledge of the medical students.

Analyzing data of the questionnaire indicated the animal dissection could help the medical students to understand the viscera and serous membrane anatomy. They perceived that these methods create more situations for communication and nearly 89% of all medical students were interested to use the methods for other parts of anatomy such as head and neck and limbs (Table 3).

DISCUSSION

Result of this study indicated the use of animal dissection could improve the knowledge of learners and provided deeper conceptual understanding of anatomical science. Further, our result showed the medical student were interested to help to each other in the dissection laboratory with experimental animals and interested to palpate the viscera. Understanding of anatomy plays a pivotal role for medical student and health care professionals (11). Moreover, the number of cadavers in many of the medical school in Iran is few so the education of human anatomy science remains a difficult challenge for teachers and instructors. In addition, in this study the animals were not fixed so there was not any formaldehyde exposure to the environment so the instructors had not any fear of palpation or infection disease. Whereas, medical student had not forgotten the smell of formaldehyde in the first when they meet with the cadaver (12). In accordance with our study, it has been shown that the dissection has a particular effect and it is absolutely essential for teaching anatomy for medical students and is an integral part of the medical curriculum (13). The fact of the matter is that medical schools not only in our country but also in other countries are faced with a shortage of cadaver (14). So, the use of animals' dissection can partly compensate this problem. Further, there are many similarities between humans and mammals that motivate students to touch and offer the possibility to learn and practice manual skills. Furthermore, educational planning

Table 2. Anatomical *knowledge* based on the mean scores in both groups

Anatomy courses	Group I	Group II	P value
Thorax	15.8±3.1	14.1±1.1	0.01
Abdomen	15.1±1.4	16±1.4	0.01
Pelvis	17.7±1.2	17.4±1.8	0.43

Table 3. The questionnaire results for assessing attitude, mean and SD

Row	Questionnaire items	Number of responding	Mean±SD
1	Animal dissection covers content of serous membrane and viscera anatomy	55	4.1±.3
2	Animal dissection enhance my understanding of anatomy of the serous membrane and viscera	65	4.8±2.1
3	Animal dissection enhance my understanding vascular and nervous pathways to viscera trough the serous membrane	63	4.7±.2
4	Animal dissection is an appropriate manner for more relationship with students and other colleagues	61	4.5±3.1
5	Would you prefer to use the animal dissection in the other courses of anatomy?	61	4.8±1.1
6	Would you prefer to replacing the animal dissection with computer assisted learning system or pictures?	59	1.1±0.2
7	Do you think the animal dissection is relevance to the anatomy courses?	47	3.9±3
8	Do you agree the animal dissection is effective in learning the anatomy knowledge of the serous membrane?	49	4.8±2.2
9	Do you agree the animal dissection is effective in learning the anatomy knowledge of the viscera?	49	3.1±0.3
10	Do you have any concern about dealing with animal dissection?	52	1.3±0.2
11	Do you think the animal dissection helps to improve student's teamwork?	53	4.9±1

active participation in teaching leads to better results and satisfaction for learners (15, 16).

In addition, in our department, this method serves as particular time and situation to create better feeling and behavior toward each other. In support of this study, dissection encourages medical students to team working and develop more communication skills with each other and colleagues (11). Some student's comments indicating the positive feedback of this teaching method such as: I see the foramen epiploic, lesser omentum and who the greater and lesser sac is connected with each other. I palpated the proper mesenteric and see the superior mesenteric and their branches through the mesentery and reach the intestine. The thymus of the goat and rat is very big and interesting. Now I see the greater omentom and who the peritoneal membrane protected the viscera in their position.

Although different methods including computer-assisted learning image, multimedia approach, plastic model are current trends in education, dissection must not be removed from the medical school in other words dissection is a good teaching method that is better than technique (17, 18). Thus, the innovation educational methods and technology could supplement dissection laboratory than as substitute (17). In contrast to the surface approach, dissection is concomitant with the deep learning in anatomy (19, 20, and 21). In another study, 94% of German and 82% of Ethiopian medical student concept the dissection course is very relevant and they did not want to replace with the other methods (14). In our medical school there is a weak relation between the physicians and basic science groups to performance of educational clinical approach in anatomy. So, the use of animal dissection is an opportunity to help motivated medical student to find a deep understanding of the structure and functions of the various organs while studying the theory. Medical students have enough time to palpation the organs and the academic faculty with dissection technique could answer the questions. In accordance with our study, in 1970 the Washington University made the dissection laboratory an elective course, but 90% of medical student signed up for the elective and the dissection returned to the curriculum (22).

However, the dissection laboratory creates an opportunity for medical students to improve their knowledge and perceive structure of the human body by tactile, visual and auditory (17, 23).

In conclusion, this enthusiasm and opportunities encourage anatomist for more use of animal for education of anatomy and we think the some anatomical materials such as dissection are irreplaceable part of training for medical students.

ACKNOWLEDGEMENT

We would like to thank all the medical students who participated in this study.

Research committee approval and financial support: Funding for this project was provided by Yasuj University of Medical Sciences in Iran, project Code: 3451.

Conflict of interest: There is no Conflict of interest in this study.

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