ORIGINAL ARTICLE

Evaluation of Clinicians' Awareness regarding the Impact of Robotic Telepathology on Patient Care in Near Future

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ABSTRACT

Background: Telepathology is a rapidly emerging technique which is being used for the diagnosis of patient's lesions and continuing medical education. The process of telepathology is comprised of digitalization of gross and microscopy pictures of various pathological lesions which are shared via telecommunication media to distant histopathology centers and specialist pathologists for the purpose of seeking consultation from experts in that particular field. In dynamic (real-time) telepathology, the histopathologist evaluates the microscopic glass slides of pathological lesions remotely with a robotic microscope. The application of telepathology would enhance the quality of patient care and reduce the medical costs.
Aim: To evaluate the awareness of Robotic Telepathology among the clinicians.
Methods: A total of 130 structured proformas have been distributed among the willing participant from the Northern Border University - Arar during the period of April 2018 to July 2018. The structured questionnaire based on literature was also translated in Arabic to enhance the understanding of the questions.
Results: A total of 109 completely filled proformas were received from the participants. There were ten questions in the proforma which were aimed to evaluate the knowledge of participant regarding the telepathology for patient care and continued medical education for physicians. The data analysed revealed that a significant number of the participants have less knowledge about the telepathology. There are five questions which reflected the attitude of clinicians towards this new way of communication. The data analysis revealed that the attitude was quite positive for adopting this new adjunct technology for better patient care and contribution in the continued medical education for health care providers.
Conclusion: The awareness of Robotic telepathology is required among the health professionals and it may be included in the curriculum for undergraduate medical students so that they would be aware of it from the earlier years of their training.
Keywords: Telepathology, Robotic microscopy, Frozen section, Histopathology

INTRODUCTION

Telepathology is a newly developing technique which is being employed for the diagnosis of patient's lesions, research and for teaching such as the distant continuing medical education programs[1]. The telepathology includes the process of digitalization of histopathological images of the lesions for transmission along telecommunication pathways for consultation[2]. In dynamic (real-time) telepathology, the histopathologist evaluates the microscopic glass slides of pathological lesions remotely with a robotic microscope. Television / video microscopy has laid down the foundation of telepathology. Video microscopy has been used for diagnosis over the past decades and it has yielded promising results[5].

The research has provided a significant evidence for the acceptability and feasibility of telemedicine for its use in the diagnosis of various lesions. Under certain specific circumstances, the surgeon may need pathological diagnosis very urgently for intraoperative decision making, which may be accomplished with frozen section. In these conditions, Robotic telepathology may provide remote consultation via a remote microscope. The real-time telepathology has got paramount importance in intraoperative histopathological consultation[6]. With the help of robotic telepathology, the remote areas without the availability of consultant histopathologist may be able to get the desired consultation intraoperatively (Frozen section).

The application of telepathology improves the diagnostic accuracy in pathology which would enhance the quality of patient care and reduce the medical costs by reducing the number of two stage surgeries and decreasing the chance of shifting of patients from far-flung areas to central cities[3,4,7]. This technology would be of a great use to provide the appropriate diagnostic facilities for military personnel deployed in remote area for military operations and exercises. In near future, the application of telepathology would be a great help in the enhancement of quality of patient care and in reduction of medical costs.

The awareness of Robotic telepathology is required among the health professionals and may be included in the curriculum for undergraduate medical students. For the evaluation of awareness of Robotic telepathology among the clinician associated with northern border University – Arar, Kingdom of Saudi Arabia, the baseline study is outlined which included 15 items for the assessment of knowledge and attitude of the clinicians towards the application of robotic telepathology for patient care. The aims and objective of the present study is to evaluate the level of awareness of Robotic telepathology among the health care providers associated with Northern Border University Arar, Kingdom of Saudi Arabia.

MATERIALS AND METHODS

After getting the approval of present study from the ethical committee, the structured questionnaire was distributed

among the willing participant. A total of 130 proforma of structured questionnaire were distributed among the health professionals which included 65 senior doctors and 65 freshly graduating young health professionals from the faculty of medicine, Northern Border University. This study was conducted for the period of four months commencing from April 2018 to July 2018. The structured questionnaire was also translated in Arabic to enhance the understanding of the questions. For the selection of participants of the present study, a simple random sampling technique has been used. The consent has been taken from the willing participant after discussing with them the aims and objectives of the study. The confidentiality of the participants was ensured. A total of 109 completely filled proformas of questionnaire were received from the participants which included 56 senior doctors from the faculty of medicine and 53 freshly graduating health professional from the faculty of medicine, Northern Border University, Arar.

The structured questionnaire comprised of fifteen questions which included ten questions for the evaluation of the knowledge of the participant regarding the use of telepathology for the patient care and continued medical education. There were five questions in the structured questionnaire which dealt with the attitude of physicians towards this new technique. After collecting the filled proforma of questionnaire from the participant, the data was entered in the excel sheet and subsequently analysed.

RESULTS

A total of 109 person participated in the present study, which included 56 senior doctors (35 male and 21 female) and 53 junior health professionals (16 male and 37 female). There were ten questions in the structured proforma which aimed to evaluate the knowledge of participant regarding the telepathology for patient care and continued medical education for physicians. The data analysis revealed that a significant number of participants had less knowledge about the use of telepathology for patient care and continued medical education. The results are shown in table 1. There were five questions which dealt with the attitude of physicians towards this new technique. The data analysis revealed that the majority of the participant had positive attitude towards this new adjunct technique for the patient care and for the purpose of continued medical education. The results are depicted in table 2.

Table 1: Evaluation of Clinicians' Knowledge Regarding Telepathology

Questions	Doctors (n)	Yes		No	
		n	%	N	%
Do you know that The process of telepathology is comprised of digitalization of histopathological and gross photographs of various pathological lesions which are transmitted by telecommunication to distant places for the purpose of seeking consultation from experts of that particular field?	Senior (56)	26	46.4	30	53.6
	Junior (53)	34	64.2	19	35.8
Do you know that the telepathology is being used for continuous medical education?	Senior (56)	26	46.4	30	53.6
	Junior (53)	27	50.9	26	49.1
Do you know that the microscope is controlled from the distant in this robotic telepathology system with internet connection?	Senior (56)	25	44.6	31	55.4
	Junior (53)	26	49.1	27	50.9
Do you know that the telepathology opens the option of getting the second opinion from another pathologist colleague present at distant place and this helpful option makes the telepathology more attractive for the pathologists?	Senior (56)	27	48.2	29	51.8
	Junior (53)	30	56.6	23	43.4
Do you know that The dynamic telepathology provides an opportunity to the pathologist to evaluate the various area of glass slide on low as well as on high power magnification with the help of robotic microscope located at the distant place?	Senior (56)	22	39.3	34	60.7
	Junior (53)	32	60.4	21	39.6
Do you know that the images of pathological lesions are posted electronically to the other consultant in the process of static telepathology?	Senior (56)	25	44.6	31	55.4
	Junior (53)	33	62.3	20	37.7
Do you know that the Robotic telepathology for Frozen section analysis and diagnosis enable expert consultation intraoperatively?	Senior (56)	27	48.2	29	51.8
	Junior (53)	35	66.0	18	34.0
Do you know that in the intraoperative decisions for the management of lesion, the frozen section diagnosis plays a very important role)?	Senior (56)	27	48.2	29	51.8
	Junior (53)	41	77.4	12	22.6
Do you know that there are certain technical limitations of frozen section and as compared to paraffin sections, the lesions are relatively more difficult to interpret on frozen section?	Senior (56)	24	42.9	32	57.1
	Junior (53)	36	67.9	17	32.1
Do you know that the limitation of frozen section includes less chance of consultation with colleagues which may increase the chance of error of interpretation?	Senior (56)	26	46.4	30	53.6
	Junior (53)	31	58.5	22	41.5

Table 2: Evaluation of Clinicians' Attitude towards Telepathology

Questions	Doctors (n)	Yes		No	
		n	%	n	%
Do you agree that use of with dynamic (real-time, robotic) or static telepathology will reduce the chance of errors in the diagnosis of surgical biopsy specimen due to more chance of consultations from experts present in the distant regions (nationally or internationally)?	Senior (56)	37	66.1	19	33.9
	Junior (53)	38	71.7	15	28.3
Do you agree that the dynamic (real-time) telepathology, will be very helpful in improving the patient care in near future?	Senior (56)	40	71.4	16	28.6
	Junior (53)	39	73.6	14	26.4
Do you think that the diagnostic accuracy will be more with the use of dynamic telepathology (real time – robotic) as compared to the use of static telepathology?	Senior (56)	29	51.8	27	48.2
	Junior (53)	40	75.5	13	24.5
Do you agree that use of dynamic (real-time, robotic) telepathology will reduce the chance of errors in the diagnosis in frozen sections?	Senior (56)	31	55.4	25	44.6
	Junior (53)	42	79.2	11	20.8
Do you think there should be some workshops/ lectures on this topic for clinicians?	Senior (56)	42	75.0	14	25.0
	Junior (53)	32	60.4	21	39.6

DISCUSSION

Histopathological diagnosis has got paramount importance in the management of various diseases particularly the cancers ant it plays a very vital role in patient care. Histopathology is a sub-discipline of pathology which highly emphasizes the importance of visual recognition of gross and microscopic features of various lesions. The diagnosis of various diseases is based on characteristic histological features which are recognized on glass slides with the help of microscope. Mutual consultations with other colleagues and second opinions from the expert consultant have a significant impact on the accuracy of diagnosis.

Over the past few decades, there is a significant advancement in the process of digitalization and telecommunication which have strongly influenced the healthcare including the pathological diagnosis. The use of digitalization and telecommunication in the diagnostic pathology has improved the accuracy and efficiency in the diagnostic services. Digital pathology is emerging as an efficient tool for the better patient services, medical education and research. The digitalization of glass slides by whole glass slide imaging is quite useful for the purpose of teaching and acquisition of second opinion from the other consultants[8].

Another important advantage of digital pathology is to seek intraoperative consultation (frozen section) from a remote area by use of telepathology which may include whole slide imaging, video microscopy or robotic microscopy[9]. It has been documented that the accuracy in the diagnosis with the help of telepathology is close to the traditional histopathology[10].

The use of telepathology in frozen section diagnosis is quite effective for the improvement in the patient care and it can play a vital role for further improvement and standardization of health care for distant and remote areas[11,12].

The digital pathology may reveal certain sub visual features of the diseases which may be invisible to the pathologist. In this regards, these additional features may be helpful in the better prediction of disease prognosis[13]. Work place ergonomics becomes better due to digital pathology[14].

In order to use these innovative digital technologies for the improvement of patient care, equipment and infrastructure for communication is required along with a reasonable level of training. In spite of significant advances in the telecommunication, the use of telepathology is quite low in various countries of the world which may be attributed to the some resistance from the pathologists for the use of digital pathology in diagnostics[15].

Lack of optimum knowledge generates resistance towards the application of new techniques. It would be imperative to enhance the awareness level among the stakeholders for the appropriate utilization of the new techniques and modalities for the beneficial outcome. In the present study, a significant number of participants have deficient knowledge regarding the telepathology. It would be important to raise the level of awareness of telepathology among the health care providers by arranging workshops and seminar and it is suggested that it may be included in the undergraduate curriculum. In the present study, the doctors' views reflected positive attitude for adopting telepathology for better patient care.

CONCLUSION

The awareness about telepathology for better patient care and for the purpose of continued medical education is required among the health care providers and it may be included in the curriculum for undergraduate medical students so that they would be aware of it from the earlier years of their training.

Conflict of interest: Nil

Funding: This study has been funded by the Deanship of Scientific Research, Northern Border University **–** Arar , Kingdom of Saudi Arabia.

Acknowledgement: The authors are thankful to Amin Khalid Hidayto Allah Makhdoom, Muaz Bilal Abdulhameed Wali, Maali Sobhi Turky Alshammeri, Abeer Hassan Abdul Aziz Aljehani for data collection and Dr. Asmara Syed for her technical assistance.

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