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Original Article

Evaluation of Clinical Diagnosis Effect of Intracranial Aneurysms Combined with Artificial Intelligence Assistant Diagnosis System

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ABSTRACT

Objectives: An intracranial aneurysm, usually referred to as an abnormal bulge in the wall of an intracranial artery, is the number one cause of subarachnoid hemorrhage and ranks third among cerebrovascular accidents after cerebral thrombosis and hypertensive cerebral hemorrhage. Head CT Angiography (CTA), magnetic resonance Magnetic Resolution Imaging (MRI) and Digital Subtraction Angiography (DSA) are currently common diagnostic methods. Artificial Intelligence (AI) is a new interdisciplinary, which can greatly help doctors diagnose and treat. Many researchers have contributed novel insights to the study of clinical diagnosis of intracranial aneurysms, which serves as the research direction and foundation of this paper. This study aims to explore how to use artificial intelligence technology to assist doctors in the diagnosis of intracranial aneurysms to improve the accuracy and sensitivity of diagnosis. **Materials and Methods:** This paper introduced the background of intracranial aneurysm and auxiliary diagnosis system and then carried out academic research and summary on the two key sentences of clinical diagnosis of intracranial aneurysm and the effect of AI auxiliary diagnosis system on clinical diagnosis of intracranial aneurysm. After that, the algorithm model was established and the algorithm was proposed to provide a theoretical basis for the analysis of clinical diagnosis effect of intracranial aneurysms combined with AI auxiliary diagnosis system. Next, the principles and technical methods of the basic theory were analyzed. At the end of the paper, the simulation experiment was carried out and the experiment was summarized and discussed. **Results:** A total of 50 patients with intracranial aneurysms were studied in clinical diagnosis. It can be seen that the accuracy and sensitivity of MRI (Magnetic Resolution Imaging) in detecting aneurysms were significantly different from those of CT (Computed Tomography) and DSA (Digital Subtraction Angiography); DSA was significantly superior to CT and MRI in the details and neck of the aneurysm and there was a significant difference between them. At the same time, with the research on the clinical diagnosis effect of intracranial aneurysms, the research on artificial intelligence assisted diagnosis system is also facing new opportunities and challenges. **Conclusion:** Intracranial aneurysms should be treated as soon as possible after diagnosis and the judgment rate of DSA for intracranial aneurysms is high.

Keywords: Intracranial Aneurysms, Clinical Diagnostic Effect, Artificial Intelligence, Auxiliary Diagnostic System.

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INTRODUCTION

Exploration background

With the recent improvement in the informatization of medical institutions, the development of big data technology and advancements in hardware and computer technology, the technical and data reserves in the medical field have become sufficient to support the development of AI. Therefore, AI has a very good prospect of application and development in the medical field and has been widely used in many fields. Intracranial aneurysm is a relatively common cerebrovascular disease with many causes. Its clinical manifestations are mostly the protrusion and bulge of local intracranial arteries. There is no sign of this disease before it occurs, but once the blood vessel ruptures, it would endanger the patient's body. Relevant data showed that the death rate of patients with ruptured aneurysm is high and neuropathy may occur in the surviving patients, which seriously affects the quality of life of patients. In recent years, with the progress of imaging technology and the continuous improvement of surgical methods, this paper summarized the diagnosis and treatment of intracranial aneurysms.

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Explorations on clinical diagnosis of intracranial aneurysm

Many scholars have studied the clinical diagnosis of intracranial aneurysms. Yang Hecheng believed that age is an important risk factor for patients to form intracranial aneurysms. Aneurysms increase the risk of cerebral hemorrhage in patients and their rupture is related to the size, location and shape of the aneurysms.[1] Wang Jun believed that coma, hyperglycemia or hypothermia at admission and indwelling CVC (central venous cather) are the main risk factors for patients undergoing intracranial aneurysm surgery.[2] Wang Jen-Chun said that aortic aneurysm and intracranial aneurysm have multiple clinical risk factors, genetic susceptibility and molecular signal pathways.[3] The study by Arjen Lindenholz on magnetic resonance imaging of the intracranial vascular wall has received significant attention over the past decade and has become an integral part of the most advanced imaging protocols for diagnosing the causes of ischemic stroke.[4] Ellis Jason A believed that the specialized cerebrovascular treatment centers should be managed by experienced high-capacity doctors to achieve the best results. These centers are composed of personnel specially trained in neurovascular surgery and personnel trained in open cerebrovascular neurosurgery.[5] After the artificial ground segmentation of intracranial aneurysms by Joo Bio, a deep learning algorithm was established using the training set and its sensitivity, positive predictive value and specificity were evaluated in the internal and external test sets.[6] The above studies have achieved good results, but with the continuous updating of technology, there are still some problems. The diagnosis of intracranial aneurysm is limited by clinicians' personal experience, which makes it difficult and time-consuming to diagnose; on the other hand, in the vast number of grassroots hospitals, it is common for doctors to misdiagnose, underdiagnose and over-treat aneurysms due to their lack of experience in identifying aneurysms. Research on clinical diagnosis of intracranial aneurysms by combining artificial intelligence-assisted diagnosis systems is of great significance. It is expected to improve the accuracy, sensitivity and timeliness of diagnosis and bring better hope for patient treatment and recovery.

Explorations on the clinical diagnosis effect of combined AI assistant diagnosis system for intracranial aneurysms

How to study the clinical diagnosis effect of intracranial aneurysms combined with AI assistant diagnosis system has been analyzed by many scholars at different levels. Shi Z reviewed discuss of AI in the treatment of aneurysms, including detection, prediction and a brief discussion of the challenges and future directions of AI clinical application.[7] Duan Haihan believed that intracranial aneurysm is a cerebrovascular disease that can cause a variety of diseases. In clinical practice, DSA is the gold standard for diagnosing intracranial aneurysm.[8] Nakao Takahiro reported the usefulness of computer-aided detection in detecting cerebral aneurysms. The improvement of the performance of CAD (Computer Aided Design) would help to detect cerebral aneurysms.[9] By comparing the diagnostic performance of deep learning neural network with that of human patients, Faron Anton studied its clinical potential as a support tool for 3D (3 Dimensions) time-of-flight magnetic resonance angiography in detecting intracranial aneurysms.[10] Liu Xinke developed a 3D convolution neural network model to detect and segment intracranial aneurysms on 3D rotating DSA images.[11] Zeng Yuwen believed that timely and accurate auxiliary diagnosis of intracranial aneurysms can help radiologists quickly formulate treatment plans, save lives and reduce costs.[12] Lehnen N C pointed out that early detection of cerebral aneurysms is crucial to ensure timely treatment. In the future, AI-based software tools are expected to improve the ability of radiologists to detect cerebral aneurysms and other diseases.[13] The above researches showed that the combined AI auxiliary diagnosis system plays a positive role in the clinical diagnosis of intracranial aneurysms, but there are still some problems.

Summary

This paper studied the analysis of the diagnostic effect of intracranial aneurysms based on AI-assisted diagnosis. Firstly, it analyzed the principles and technical methods of the basic theory and then gave the connotation and significance and subdivides the content. The BP (back propagation) neural network algorithm model based on AI was used to provide theoretical basis for the experiment. Finally, the simulation experiment analysis was carried out and provided reference significance for such research.

Principles and Technical Methods of Basic Theory

AI-assisted diagnosis

With the continuous development of economy and society, medical and health work has made great progress, but at present, it is still facing problems such as uneven distribution of resources and unreasonable layout. Therefore, how to reduce the current pressure through its own development speed and development trend has become a difficult task. Building a complete medical record and health file is an inevitable requirement for the development of medical cause. A large number of documents, tables, pictures and other data can be integrated and analyzed by AI to find out the problems of medical service and reasonably improve the quality of medical service and medical resource allocation to solve the doctor-patient disputes. This can realize the integration, analysis and sharing of medical data and provide reasonable and effective help for medical diagnosis and treatment. It is also an effective way to introduce AI into the medical field.

Etiology of intracranial aneurysm

The related causes of intracranial aneurysms summarized in this paper are shown in Figure 1.

Congenital factor

In patients with aneurysms, the variation of cerebral arterial ring is larger than that of normal people and the formation of anterior communicating artery aneurysms is related to the formation of posterior communicating artery aneurysms. The former not only supplies blood to the aneurysms but also supplies blood to the arteries on both sides.

Arteriosclerosis

Arteriosclerosis on the arterial wall would destroy the elastic fibers, thus making the vascular wall unable to withstand pressure. Arteriosclerosis can lead to food vessel obstruction and vascular wall damage. The main causes of arachnoid neuroma are arteriosclerosis and congenital artery development. Recently, it has been found that the incidence rate of pituitary adenoma is higher than other tumors, but whether this is related to the high and long-term atherosclerosis caused by growth hormone is unknown.

Infection

A small part of infectious aneurysms are aneurysms. The infection of the whole body is transmitted to the branches of the cerebral artery through small emboli and some are fixed in the arterial branches. The shape of infectious aneurysms is often irregular.

Trauma

In surgical operations, the arterial wall may be directly injured by foreign bodies, instruments, bone fragments, etc., or the vascular wall may become thinner and form true or false aneurysms due to the involvement of vascular softening. However, most of the cases are due to the penetration of sharp objects through the pterion, thus damaging the middle cerebral artery, anterior cerebral artery, pericallosal artery and ophthalmic artery.

In addition to the above reasons, there is a common hemodynamic shock factor. In clinical practice, if the cerebral artery is removed surgically, the associated aneurysm would shrink or disappear and most of the blood vessels come from the anterior cerebral artery, while the other side of the anterior cerebral artery is underdeveloped. Polycystic kidney can lead to high blood pressure, leading to aneurysm or even multiple aneurysms.

How to establish AI auxiliary diagnosis system

The use of AI technology for medical diagnosis must be through the establishment of data and business models and the in-depth learning algorithm of AI can be used to realize the structure of medical records. Modern medicine emphasizes that experiments and objective clinical trials are data-oriented research methods and only analyze the clinical diagnosis process of doctors from the perspective of data processing. The first is to collect data and then process the collected information to form the characteristics of the case. By comparing with the diagnosis rules of the disease that he has mastered and by comparing the past treatment experience with the past case data, the possible disease can be got. After that, it is supplemented according to the diagnostic rules of the disease, until the diagnostic points of one or more diseases reached or exceeded the diagnostic threshold in the doctor's brain, the doctor could determine the diagnosis of the patient.

There are two technical difficulties in establishing this system: one is the adjustment of language processing and disease prediction algorithm. First of all, language processing. Due to the low level of informatization in current medical institutions, their established norms are different and the unorganized text information in massive electronic medical records cannot be used without organization, so it can only be preprocessed by natural language. The variability of language makes it difficult to accurately analyze its semantics and morphemes. Compared with other methods, language is mainly composed of phrases and its complexity makes it difficult to study the semantics and morphemes of language on the computer, which adds obstacles to the realization of the structure and intelligence of electronic medical records. The other is the selection of system algorithm. There are many algorithms in AI field and a lot of experiments and experiments can be carried out on them, which has proved its advantages in prediction ability.

Through the in-depth study of the algorithm, this paper found that there are a large number of parameter point arrays in the BP neural network, so that it can be better controlled. The higher the level is, the higher the matching degree is and the higher the requirements for computing speed is. In view of the principle that clinical assistant decision-making should not affect the clinical work of doctors, it is necessary to establish a diagnosis model with rapid response ability. When a disease is predicted, it is based on the algorithm knowledge base to provide doctors with the possibility of prediction and prediction of the disease and give the diagnosis points related to the disease.

Problems and Challenges Faced by AI Assisted Diagnosis Technology

The 4 points summarized in this article about the problems and challenges faced by AI-assisted diagnostic technology are shown in Figure 2.

Lack of cooperation between medical enterprises

Data is an important part of AI technology. Generally, enterprises can cooperate with hospitals to obtain relevant data of CT scanning. However, there are many models and suppliers on the market at present. If it is used on other models of equipment, the model needs to be retrained due to the difference of voltage and other parameters.

Lack of practical experience

Although the diagnostic technology of AI has developed to a certain extent, there are still many problems in practice. Enterprises usually build their own databases when modeling. Therefore, it is not practical to carry out some specific or standard experiments without clinical tests. In order to avoid graph theory, the algorithm optimization of medical image aided diagnosis products becomes an urgent problem to be solved. In the diagnosis of symptoms, the doctor should combine the examination of Doppler gland to determine whether there is corresponding antibody.

Unclear phenomenon of medical director

Although AI has important application value in medical diagnosis, there are many defects in identifying medical responsibility. If the user is using the virtual assistant, there may be omissions or incorrect statements, which make it unable to meet the user's requirements. Therefore, regulators have extremely stringent requirements for the application of AI. If the diagnosis software gives the diagnosis conclusion according to the algorithm and only has the auxiliary diagnosis function but does not directly provide the diagnosis conclusion, it cannot be taken as the basis. If the focus can be automatically identified and a clear diagnosis can be given, then clinical experiments must also be carried out. In the future, it is necessary to improve the clinical application of AI and clarify the identification standard of AI and the subject of its legal liability.

Unbalanced distribution of medical resources

Whether it is to establish a standardized and unified medical information system or a complete knowledge system, designing a set of auxiliary diagnosis system for special diseases cannot be separated from professional medical technology and rich clinical practice. However, due to the large population and the lack of high-quality medical resources per capita, some doctors and experts are often busy with clinical diagnosis, although they expect AI to change the diagnosis and treatment mode, they cannot devote a lot of energy to participate in relevant research work. To this end, it is necessary to improve cross-industry cooperation institutions and incentive mechanisms. The rapid and healthy development of this industry can be promoted by establishing relevant innovation centers, developing new scientific and technological projects and implementing the effective strategy of combining production, education and research.

Suggestions for the Development of AI Assisted Diagnosis and Treatment

Development suggestions

Break through data islands and establish interdisciplinary knowledge centers.

AI is a kind of auxiliary diagnosis technology based on big data. It needs to break through the data island and establish an interdisciplinary medical knowledge center from data to knowledge and then from knowledge to intelligence, so as to form an open and interconnected medical information system.

First of all, it is necessary to construct a complete knowledge base of medical ontology to uniformly describe the content of existing medical ontology. It is not only reasonably classified and coded and managed, but also regularly revised and supplemented. Secondly, it is necessary to integrate different sources and types of medical data. A map of medical knowledge can be constructed according to the inter-institutional structure of different subject areas and the digital system of medicine can be improved to promote the construction of medical semantic networks. It can build tools such as medical concept query and literature retrieval to provide authoritative and accurate medical information query channels for medical workers. It can analyze the information of medical institutions at all levels, various health information sources and medical institutions and integrate individual health files, biological samples, gene sequences, medical care, behavior habits and even living environment. At the same time, the existing information system has been standardized, so that the data format and description are standardized and unified and the storage and expression of data from different organizations are standardized. The data between various institutions can be connected through a unified information interface, which can optimize the management structure of medical services and achieve real-time update of medical service information. Finally, the sharing of medical service information among institutions would be achieved.

Improve medical diagnosis system in many ways

Applying AI to diagnosis does not mean that AI can replace doctors, but should establish a new medical diagnosis system to integrate AI and biological intelligence. The cognitive model can be used to improve people's understanding of the medical field so as to improve people's understanding of the medical field. In terms of medical instruments, it is necessary to strengthen the research and development of high-end medical instruments in China and promote the research and development of intelligent instruments and intelligent wearable instruments, so as to realize the data connection with the hospital information management platform and facilitate the application of AI system. In terms of medical staff, hospitals should establish a medical information talent training system and strengthen the thinking mode and ability of medical staff to apply AI, so as to change the traditional working procedures and working methods. At the same time, it is necessary to encourage medical workers to actively participate in the research of medicine and AI and take AI as a new way to study medicine and understand medicine, so as to promote the continuous updating and development of medical theory. In medical education and training, AI technology should be applied

to medical teaching and training and traditional teaching and training methods should be improved to shorten the training time of senior medical personnel.

Establish reasonable compliance standards

The development, production and approval of intelligent diagnosis system shall be carried out in accordance with relevant laws and standards. Compared with developed regions, most developing regions have not yet established relevant industry standards or industry norms suitable for intelligent diagnosis and diagnosis systems. Therefore, medical information and AI industry standards that meet the requirements of technological development should be formulated as soon as possible and corresponding support should be given in terms of systems and regulations.

Frontier of human neuroscience

Neuroscience is an attempt to use biological mechanisms to explain mental activities, that is, cell and molecular biology.[14] Neuroscience attempts to understand how the neural circuits assembled in the process of development perceive the behavior of the surrounding world and how to restore perception from memory and once these circuits are restored, they would affect perception. Neuroscience also attempts to understand the physiological basis that supports human emotional life, how emotions affect people's thoughts and why neurological symptoms occur when emotions, thoughts and behaviors change.

Application of BP Neural Network Algorithm in Auxiliary Diagnosis System

The auxiliary diagnosis system based on BP neural network has the characteristics of self-adaptability, fault-tolerance and self-organization and BP neural network can be used for data feature screening. These data were predicted and analyzed according to the classification algorithm model. Finally, using the methods of feature selection and classification prediction, an auxiliary diagnosis system that can enable doctors to make more comprehensive and correct diagnosis of diseases was designed.

The definition formula of BP algorithm is:

$$f(x)=\frac{1}{1+e^{-x}} \quad (1)$$

Through analysis, it is found that its output is a nonlinear input in the range of 0-1. Figure 3 shows the principle of BP network.

Through Formula (2), the program of data forward propagation can be calculated:

$$\vec{a}=(x_1,x_2) \quad (2)$$

The first layer network parameters are:

$$W^{(1)}=\begin{bmatrix} w_{(x_1,1)}, w_{(x_2,1)} \\ w_{(x_1,2)}, w_{(x_2,2)} \\ w_{(x_1,3)}, w_{(x_2,3)} \end{bmatrix} \quad (3)$$

The network parameters of the second layer are:

$$W^{(2)}=\begin{bmatrix} w_{(1,4)}, w_{(2,4)}, w_{(3,4)} \\ w_{(1,5)}, w_{(2,5)}, w_{(3,4)} \end{bmatrix} \quad (4)$$

The network parameters of the third layer are:

$$W^{(3)}=\begin{bmatrix} w_{(4,6)}, w_{(5,6)} \end{bmatrix} \quad (5)$$

Among them, the *W* values of the three network parameters are variables.

The input of the first hidden layer is taken as an example, then there are:

$$z_1=W^{(1)}*(\vec{a})^T+(b^{(1)})^T \quad (6)$$

If the neuron of the first layer is taken as an example, its input is:

$$z_1=w_{(x_1,1)}*x_1+w_{(x_2,1)}*x_2+b_1 \quad (7)$$

Among them, the Z value of the hidden layer is correlated with the W value of the network parameter and the neurons of the other two layers are the same.

Overview of Experimental Materials and Methods for Clinical Diagnosis of Intracranial Aneurysms.

General materials

A total of 50 patients with intracranial aneurysms diagnosed by CT, MRI and DSA were selected as the study subjects. Among 50 patients, 32 were male and 18 were female; the age was 41-75 years and the average age was 58 years (58 ± 17). The information is shown in Table 1.

Treatment

CT treatment

Multi-slice CT was used to inject iodopanol with a high-pressure injector and the scanning software was used to automatically determine the scanning delay. The workstation was used to automatically reconstruct, volume reconstruction and maximum density projection reconstruction.

MRI treatment

MRI used a superconducting magnetic resonance scanner for three-dimensional time-hopping imaging and used three-dimensional fast interference phase sequence for imaging. All original images were subject to maximum density projection, multi-plane reconstruction and volume reconstruction.

DSA treatment

After inserting the plate subtraction device through the femoral artery catheter, the internal carotid artery and vertebrobasilar artery on both sides were developed in multi-angle and dynamic way and then three-dimensional imaging was performed.[15]

Statement of the Ethics Committee: The data samples studied in this experiment refer to relevant research in this field. No animal or human was used as the experimental object in the experiment. It is intended to promote the progress of the medical field and has obtained the written informed consent of the patient.

Observation indicators

The main outcome measures were: the sensitivity and accuracy of various examination methods in the diagnosis of intracranial aneurysms, the imaging characteristics of different imaging examinations on intracranial aneurysms and the imaging observation of tumor neck. The display of aneurysm neck is as follows: Grade A is that the aneurysm neck is not very good and difficult to measure; Grade B is that the relationship between the shape of the aneurysm and its surroundings is not ideal and the neck of the aneurysm is difficult to measure accurately; The shape of Grade C aneurysms and the multi-angle observation of the tumor neck are clear and the width of the tumor neck can be measured.

Statistical methods

In this study, SPSS19.0 statistical software was used to process the data and the average x-test was used for statistics. $p<0.05$ indicates that there is a significant difference between the two groups.

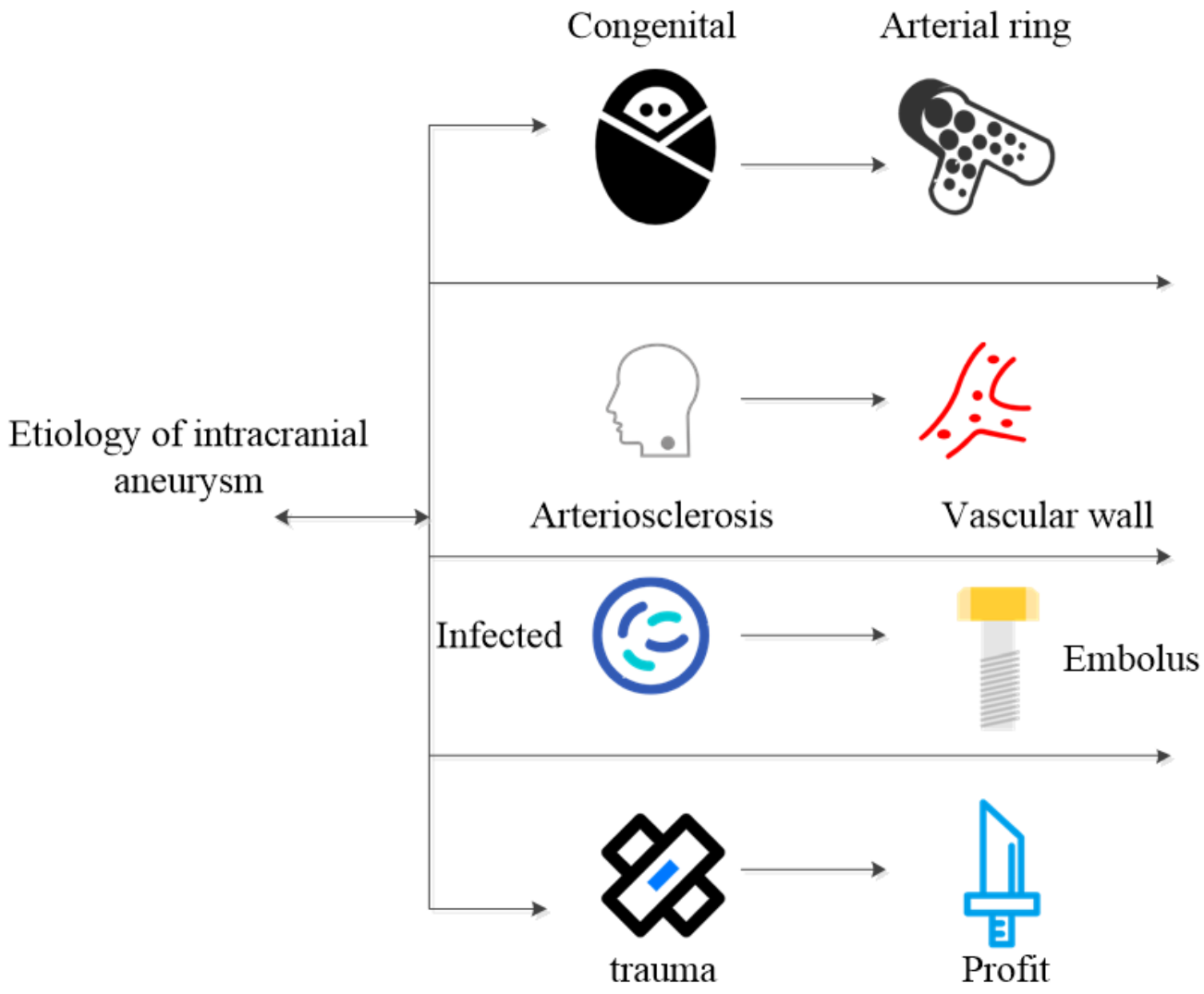

Figure 1: Related etiology of intracranial aneurysms.

Table 1: Patient classification table for clinical diagnosis of intracranial aneurysms.

Lung cancer patients	Male	Female sex	Average age
Number of people	32	18	58±17 years old
Proportion	64%	36%	/

Table 2: Comparison of the aneurysm detection accuracy.

Therapeutic method	Intracranial aneurysm			Accuracy/%	P
	Number of confirmed cases	False negative	False positive		
CT	45	2	3	90	0.03
MRI	41	4	5	82	0.02
DSA	48	0	2	96	0.04

Table 3: Comparison of the aneurysm details shown.

Therapeutic method	Aneurysm detail display		
	Grade A	Grade B	Grade C
CT	2	3	10
MRI	1	2	12
DSA	0	0	20

Simulation Experiment of AI Assistant Diagnosis System in Clinical Diagnosis of Intracranial Aneurysm

Intracranial aneurysm is a relatively common cerebrovascular disease and its etiology is unknown. Its main manifestation is the protrusion and bulge of the local intracranial artery. This disease has no sign before its occurrence, but once the blood vessel ruptures, it would endanger the patient's life. In recent years, with the progress of imaging technology and the continuous improvement of surgical methods, the diagnosis and treatment of intracranial aneurysms are summarized.

Comparison of accuracy of diagnosis of aneurysm

According to the method description in the experimental materials, the accuracy of the above three methods for the diagnosis of aneurysms was compared and which method was more suitable for the treatment of aneurysms was analyzed. The comparison is shown in Table 2.

From Table 2, it can be seen that 45 cases of intracranial aneurysms were confirmed by CT treatment, of which 2 cases were false negative and 3 cases were false positive. A total of 41 cases of intracranial aneurysms were diagnosed by MRI, of which 4 were false negative and 5 were false positive. A total of 48 cases of intracranial aneurysms were diagnosed by DSA, of which there were no false negative and 2 false positive. It can be seen that the accuracy and sensitivity of MRI in detecting aneurysms were significantly different from those of CT and DSA.

Comparison of detailed display of aneurysm

The number of 50 patients who have been treated with CT, MRI and DSA was compared and analyzed according to the ratio of 15:15:20. The comparison is shown in Table 3.

It can be seen from Table 3 that the CT treatment methods included 2 Grade A aneurysms, 3 Grade B aneurysms and 10 Grade C aneurysms. MRI treatment methods included detailed display of 1 grade A aneurysm, 2 grade B aneurysms and 12 grade C aneurysms. DSA treatment did not show details of grade A and B aneurysms, but 20 cases of grade C aneurysms. It can be seen that DSA was significantly superior to CT and MRI in the details of aneurysm and the appearance of aneurysm neck and there were significant differences between them.

With the rapid development of medical informatization, electronic medical records and health records have been applied. A large number of multimedia data, such as documents, tables, images, voice, etc., are classified and analyzed to enable the fusion and open sharing of medical data, which provides support for the process of medical diagnosis and helps improve medical and health services. It has promoted the rationalization of government decision-making and alleviated the imbalance in the allocation of medical resources. The development of AI technology provides new opportunities to solve the current shortage of medical resources.

Treatment rate analysis

Through consulting a large number of data, it is found that the successful rate of intracranial aneurysm surgery is more than 90%, especially for the regular cystic aneurysm surgery. However,

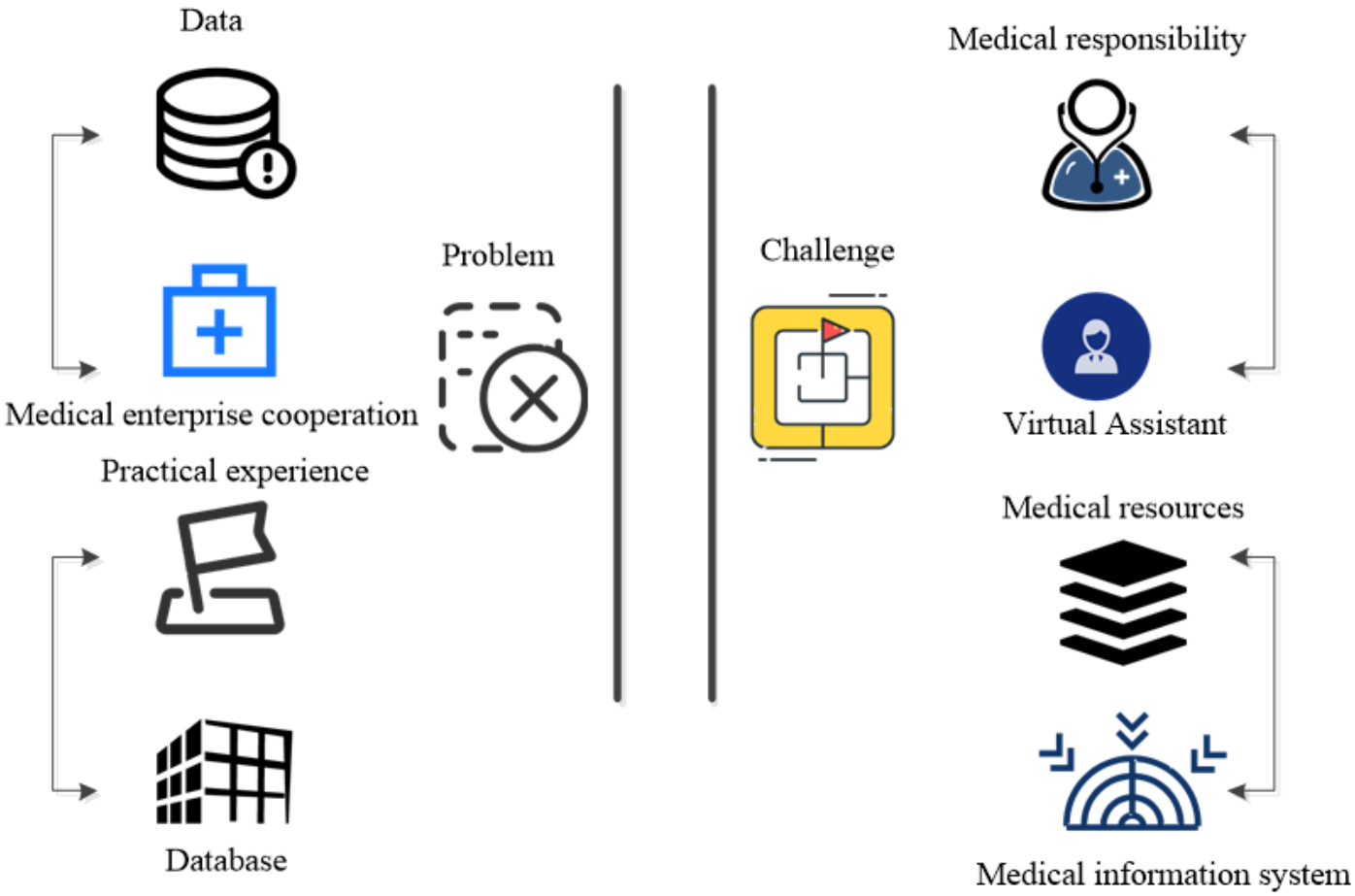

Figure 2: Problems and challenges faced by artificial intelligence-assisted diagnosis technology.

if it is complicated and irregular and there are many blood vessels around it, the success rate of the operation is very low. Therefore, the treatment rate of the AI-assisted diagnosis system and conventional treatment studied in this paper was analyzed to prove the feasibility of this method. The results are shown in Figure 4.

Figure 4a shows the treatment rate of intracranial aneurysms in the next four stages of adjuvant treatment and Figure 4b shows the treatment rate of intracranial aneurysms in the next four stages of conventional treatment; Figure 4c shows the treatment rate of intracranial aneurysms in the world. It can be seen from Figure 4 that in the four stages after the diagnosis of patients, the AI-assisted diagnosis system studied in this paper had a higher treatment rate than conventional treatment. It can be seen that the treatment rate of adjuvant treatment was more than 90%, while that of conventional treatment was less than 90% and the treatment rate of both treatments was the highest at the first stage, which also proved that intracranial aneurysms can be detected in time and actively treated by medical means to avoid posing a threat to the human body. Therefore, the correct diagnosis of intracranial aneurysms has become a worthy research direction.

Analysis of diagnosis rate

Based on the above analysis of the periodic treatment rate of intracranial aneurysms, there were five possible induced conditions of intracranial aneurysms: intracranial tumor, vascular malformation, cerebral hemorrhage, moyamoya disease and arachnoid hemorrhage. Therefore, CT, MRI and DSA were used for early diagnosis and judgment and their diagnosis and judgment rate were analyzed. The results are shown in Figure 4d-f.

Figure 4d shows the judgment rate of CT analysis on the induction of intracranial aneurysms and Figure 4b shows the judgment rate of MRI analysis on the induction of intracranial aneurysms; Figure 4e shows the judgment rate of the induction of intracranial aneurysms analyzed by DSA. It can be seen from Figure 4f that among the five inducements caused by intracranial aneurysms, cerebral hemorrhage has the smallest impact on the diagnosis and judgment rate. This is because there are more complicated cases of cerebral hemorrhage that affect the judgment of intracranial aneurysms and the appearance of intracranial aneurysms is basically to determine that patients have intracranial aneurysms. Of the above three diagnostic methods, DSA has the highest

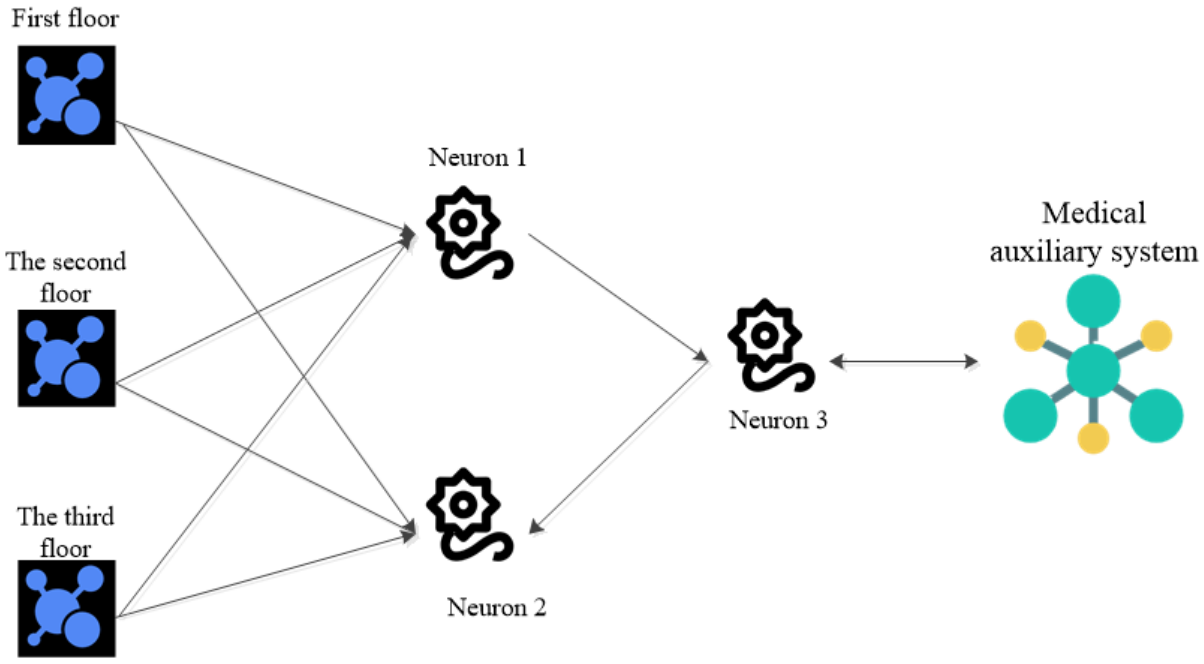

Figure 3: How the BP neural network establishes the medical auxiliary system.

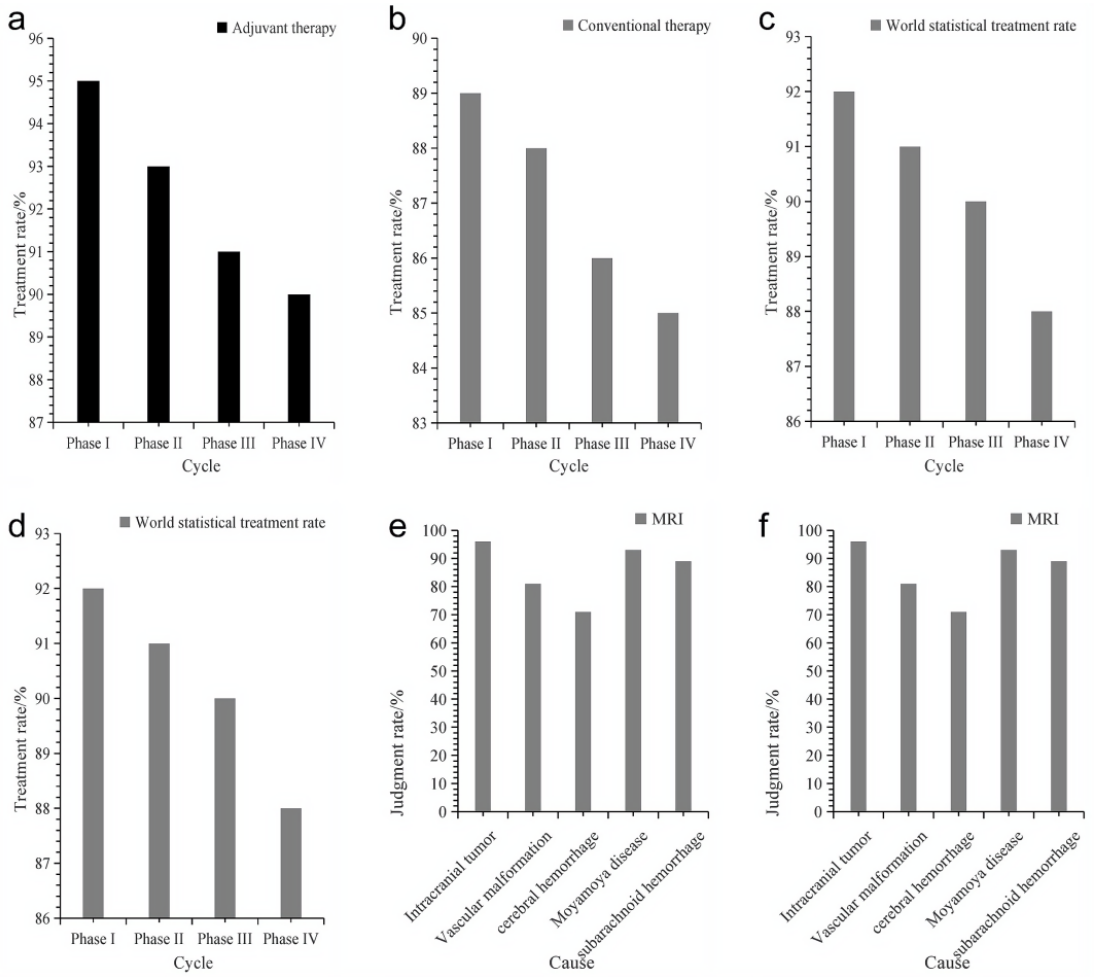

Figure 4: Analysis of treatment rate between AI-assisted diagnostic system and conventional therapy; Judgment rate of early visits. (a) Treatment rate of adjuvant therapy; (b) Treatment rate of conventional therapy; (c) World statistics of treatment rates; (d) CT: Analysis of intracranial aneurysm induction; (e) MRI: Analysis of intracranial aneurysm induction; (f) DSA: Analysis of intracranial aneurysm induction.

diagnostic rate, so this method has also become the gold standard for the diagnosis of intracranial aneurysms.

DISCUSSION

To sum up, this paper analyzed the clinical diagnosis effect of intracranial aneurysms based on AI auxiliary diagnosis system. Through the above experiments, it can be concluded that timely treatment of intracranial aneurysms in the first stage after diagnosis can effectively recover and DSA has a high judgment rate for intracranial aneurysms, which can be given priority.

At present, AI technology is extensively utilized in the diagnosis and prediction of intracranial aneurysms. With the continuous development of Al technology, doctors can more easily and accurately diagnose and predict the occurrence of intracranial aneurysms. In fact, the application of AI technology in intracranial aneurysm surgery has always been a hot spot in the academic and engineering fields. Although many enterprises have successfully obtained the patent of Al microtubule shaping, there is no report on its clinical application. With the further development of intracranial aneurysms, AI technology would be more and more used in clinic.

CONCLUSION

In recent years, AI technology is extensively utilized in the diagnosis and treatment of intracranial aneurysms and has been increasingly used in the diagnosis and treatment of intracranial aneurysms. This paper analyzed the advantages and disadvantages of AI technology in the diagnosis and treatment of intracranial aneurysms based on the research literature of relevant scholars and used various medical equipment to explore the application value of AI diagnosis system in intracranial aneurysms. By understanding the content of AI technology in the diagnosis of intracranial aneurysms and analyzing the problems and challenges faced by AI assisted diagnosis technology, this paper finally carried out simulation experiment analysis with algorithm formulas. Through four experiments, it was concluded that intracranial aneurysms should be treated as soon as possible after diagnosis and the judgment rate of DSA for intracranial aneurysms is high.

FUNDING

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

CT: Computed Tomography; **DSA:** Digital Subtraction Angiography; **MRI:** Magnetic Resolution Imaging; **CVC:** Central venous cather; **CAD:** Computer Aided Design; **3D:** 3 Dimensions.

SUMMARY

This study aims to explore how to use artificial intelligence technology to assist doctors in diagnosing intracranial aneurysms to improve the accuracy and sensitivity of diagnosis. Through a clinical diagnostic study of 50 patients with intracranial aneurysms, it was found that the accuracy and sensitivity of MRI in detecting aneurysms are significantly different from CT and DSA; DSA is significantly better than CT in terms of the detail and neck of the aneurysm. and MRI. At the same time, the study also found that artificial intelligence-assisted diagnosis systems face new opportunities and challenges in the clinical diagnosis of intracranial aneurysms. These results have important guiding significance for further improving the diagnosis and treatment of intracranial aneurysms.

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