Informed Consent Form (Project Number)

Research Project Title (Project Number)：Multi-center Study of Artificial Intelligence Model for Gadolinium-based Contrast Agent Reduction in Brain MRI (MAGNET)

Sponsor: Beijing Tiantan Hospital, Capital Medical University

CRO：

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Informed Consent Form

Dear Madam/Sir,

We invite you to participate in a multi-center study entitled "Multi-center Study of Artificial Intelligence Model for Gadolinium-based Contrast Agent Reduction in Brain MRI " funded by the SKY Imaging Research Fund Project of the China International Medical Exchange Foundation. The study will be conducted at hospitals such as Beijing Tiantan Hospital, Capital Medical University, the First Affiliated Hospital of Anhui Medical University, Yichun People's Hospital and so on. This study has been reviewed and approved by the Ethics Committee of Beijing Tiantan Hospital, Capital Medical University.

1.Why is this study being conducted?

Background: Magnetic resonance imaging (MRI) plays an irreplaceable role in the diagnosis of central nervous system diseases. The use of gadolinium-based contrast agent (GBCA) is safe in most cases during routine clinical examination. In routine clinical examinations, the use of Gadolinium-based Contrast Agent (GBCA) gadolinium contrast agents is generally safe. However, recent studies have shown that the use of gadolinium contrast agents can pose potential risks to the human body, such as gadolinium deposition and serious adverse reactions such as nephrogenic fibrosis under certain conditions. Efforts need to be made to reduce dose while still maintaining diagnostic capabilities. In recent years, artificial intelligence has been widely applied in the field of medical imaging, achieving significant results in the auxiliary diagnosis of diseases, image post-processing and reconstruction, and image synthesis. The application of artificial intelligence in medical imaging has huge prospects.

Purpose: Based on the above background, we propose to use artificial intelligence methods to predict full-dose MRI images form low-dose enhanced scans and/or precontract multimodal images, thereby significantly reducing the dose of gadolinium contrast agent used in intracranial MRI without affecting clinical diagnosis, reducing the risk of gadolinium exposure for patients, and improving the safety of contrast agent use.

2.How many people will participate in this study?

About 3,000 people will participate in this multicenter study conducted at 10 different medical institutions including Beijing Tiantan Hospital Affiliated, Capital Medical University. The study population includes non-surgical and post-surgical patients, with a total of 2,000 non-surgical patients and 1,000 post-surgical patients. Beijing Tiantan Hospital, Capital Medical University plans to invite 1,500 people to participate in this study.

3.Who is eligible to participate in the study?

Individuals with clinical indications for brain MRI enhanced scans (those who need enhanced scans), including patients with central nervous system single tumors (such as gliomas, meningiomas, pituitary adenomas, chordomas, neurilemmomas, metastatic tumors, lymphomas, germ cell tumors, etc.), patients with multiple brain tumors of the central nervous system (such as metastatic tumors, lymphomas, germ cell tumors, etc.), patients with inflammatory and infectious lesions of the central nervous system (such as multiple sclerosis, optic neuritis, cerebral abscess, etc.), patients with cerebrovascular diseases (such as cerebral infarction, cerebral vascular malformations, etc.), patients undergoing postoperative assessment for central nervous system tumors, and patients with suspected brain diseases.

4.Who should not participate in the study?

（1）Those who have contraindications for MR examinations

a) absolute contraindications: patients with cardiac pacemakers; patients who have undergone artificial valve replacement surgery; patients with ferromagnetic vascular clips in the body; patients with metal foreign bodies in the eyeball; patients with high fever and convulsions.

b) Relative contraindications: the examination area or nearby contains ferromagnetic materials; patients with metal dentures cannot undergo head, nasopharynx, or oral cavity examination; patients with implanted pumps; patients with claustrophobia; patients who cannot lie flat for more than 20 minutes, have impaired consciousness, severe hypoxia, or are restless and require rescue.

（2）patients with needle allergy or a history of adverse reactions to GBCA

（3）Severe renal insufficiency is not within the scope of this study

5.How long will this study last?

The research period is from January 1st, 2022, to December 31st, 2023.

You may choose to withdraw from the study at any time without losing any benefits that you are entitled to receive. However, if you decide to withdraw from the study during the research, we encourage you to first consult with your doctor. Considering your safety, a relevant examination may be conducted after your withdrawal.

6.How is the study conducted?

If you agree to participate in this study, doctors will inquire about your medical history (such as whether you have any contraindications to MRI examinations, or have had adverse reactions to gadolinium contrast agents in the past), and you will undergo basic examinations (such as respiratory rate, body temperature, heart rate, detection of metal prostheses, serum creatinine, and for women, pregnancy testing) to further confirm whether you are suitable for the study.

We will record your clinical information on the same day and perform a contrast-enhanced cranial MRI examination on that day (for 20 minutes). When injecting gadolinium contrast agent, it will be done in two injections (first injection: 10% or 25% of the standard dose; second injection: the remaining 90% or 75% of the standard dose). This will increase the patient's scan time (4-6 minutes) but will not affect clinical evaluation. The method of random selection will be used. The first 1,500 subjects will receive 25% of the dose and the remaining 75%, while the latter 1,500 subjects will receive 10% and the remaining 90%. The clinical evaluation includes the use of quantitative imaging evaluation and clinically relevant evaluation methods for the simulation and synthesis images. If you are a postoperative patient, disease recurrence will also be evaluated in addition to the above evaluation contents.

7. What obligations do I have if I participate in the study?

During the research period, you have an obligation to state your medical history and condition, undergo various examinations as directed by your doctor, and consciously comply with the relevant rules and regulations related to patients that are established by the national laws, regulations, and medical institutions.

8.What are the costs associated with participating in the study?

You will need to bear the cost of the MR examination, but you will not need to bear the costs of other examinations such as serum creatinine and pregnancy testing for women.

9.What benefits does participate in the study have for my disease treatment?

You will receive timely access to all evaluation and examination results, and the information obtained from this study will help to reduce the amount of contrast agent injection during enhanced MRI examinations, reduce the risk of gadolinium exposure for patients, and further improve the safety of contrast agent use.

10.Do I have other treatment options?

You can choose to have a scan after directly injecting 100% gadolinium contrast.

11. What are the risks of participating in the study?

Magnetic resonance imaging (MRI) is currently the safest and most effective imaging method, but it can produce noise and may cause slight discomfort. If your health is damaged due to participate in this study, please notify the research doctor immediately, and they will take appropriate treatment measures. The sponsor, Capital Medical University, Beijing Tiantan Hospital will bear the treatment costs and provide appropriate financial compensation in accordance with relevant national regulations. Even if you have signed this informed consent form, you still retain all your legal rights.

12.Can I voluntarily choose to participate in and withdraw from the study?

Participation in this study is completely voluntary, and you can refuse to participate in this study or withdraw from the study at any time during the study without any reason. This decision will not affect your doctor's treatment, and your medical treatment and rights will not be affected.

For your maximum benefit, the doctor or researcher may suspend your continued participation in this study at any time during the study. If you withdraw from this study for any reason, you may also be required to undergo laboratory and physical examinations if the doctor deems it clinically necessary, which is beneficial to protecting your health.

13.What happens if there is new information related to the study drug?

Sometimes new information about the study drug is obtained. If there is any new information that may affect your willingness to continue to participate in this study, we will notify you promptly and discuss with you whether it is appropriate to continue to participate in this study.

14.How will participating in this study affect my life?

You may find these examinations inconvenient and require special arrangements. In addition, some tests may make you feel uncomfortable. If you have any questions about the tests and procedures in the study, you can consult the research doctor.

15.Is my personal information confidential?

Your medical records will be kept at the hospital. The research team, supervisory department personnel, ethics committee, monitoring personnel, audit personnel, and drug supervision and management department inspection personnel can access the subjects' original medical records to verify the process and data of the clinical trial. The above personnel have a confidentiality obligation for your personal information, and violations will be punished. Any confidentiality matters related to your identity identification records are not used publicly. If the clinical trial results are published, your identity information will still be kept confidential. We will make every effort to protect the privacy of your personal medical information within the scope allowed by law. Your name will not be reflected in any report.

16.Related consultation

If you have any questions related to this study, please contact (Siyao Xu) at the fixed telephone and mobile phone (15510139520).

If you have any questions related to your own rights, or if you want to express dissatisfaction and concerns about participating in this study, please contact the National Clinical Trial Institution Office of Beijing Tiantan Hospital at 010-59975178, or the Ethics Committee Office of Tiantan Hospital at 010-59978555. Email: ttyyirb@163.com.

Subject Consent Form

Consent to participate in this study

By signing here, I acknowledge that:

1) I have read this informed consent form, and the researchers have explained the study to me.
2) I have discussed and asked relevant questions about the study, and I am satisfied with the answers.
3) I understand that if there is any harm related to the study, I can receive compensation from the sponsor.
4) I have had sufficient time to make a decision.
5) I am voluntarily agreeing to participate in this clinical trial as described in this document.
6) I have been informed of the list of researchers whom I should consult during the study.
7) As described in this informed consent form, I agree that the researchers and other relevant individuals may have access to my medical and personal information.

Participant signature: _____ Date:

Printed name:_____ Contact number:

Signature of legal representative (if applicable):_____ Date:

Printed name of legal representative: _____Contact number:

Relationship to participant:

Witness statement:

I was present during the entire informed consent process and accurately explained the contents of the informed consent form and other written materials to the participant or legal representative. The participant or legal representative fully understood the content and meaning, and they expressed agreement to participate in the study.

Witness signature (if applicable):_____ Date:

Printed name of witness: _____ Contact number:

Investigator signature:_____ Date:

Printed name of investigator:_____ Contact number: