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Evaluation of ultra-high field MRI for planning brain tumour resection

Submission date 19/07/2026	**Recruitment status** Recruiting	[ ] Prospectively registered [ ] Protocol
Registration date 17/09/2026	**Overall study status** Ongoing	[ ] Statistical analysis plan [ ] Results
Last Edited 17/09/2026	**Condition category** Cancer	[ ] Individual participant data [X] Record updated in last year

Plain English summary of protocol

Background and study aims
Magnetic resonance imaging (MRI) is a technique that is routinely used to view structures inside the head, such as the brain, the skull, and its surrounding blood vessels. MRI uses magnetic fields and radio waves to form an image of the selected part of the body without the use of ionising radiation, such as X-rays.

An MRI technique has been developed by a research team at the University of Oxford. This technique involves using a stronger magnetic field with a new method to form clearer pictures of the blood vessels in the head with a lower scan time. This technique has been tested in healthy volunteers but has not been used with patients. This technique has the potential to improve the quality of images acquired of brain tumours, their surrounding blood vessels, surrounding tissues, and bone, with less time spent in the MRI scanner, and without any ionising radiation (X-rays).

Who can participate?
This study is open for participants who have been assessed in neurosurgery clinics at Oxford University Hospitals, who have brain tumours of the skull base.

What does the study involve?
This study will involve one MRI research scan session, in addition to any scans that the participant may receive during their clinical care. This research scan may involve the administration of intravenous contrast called gadolinium, which improves the quality of the images that will be captured during the scan.

What are the possible benefits and risks of participating?
While there are no immediate benefits for those people participating in the project, it is hoped that this research will lead to a better understanding of how these new MRI techniques can be used to improve the surgical care for patients with brain tumours. This MRI technique has not been tested in this group of people before, and we are conducting this study to explore this.

The MRI scanner that is being used in this study has a stronger magnetic field than clinical scanners that are routinely used. Because of this, the researchers and radiographers will take extra precautions around the safety for the scan.

There are certain conditions and implants that make MRI scanning unsafe in certain individuals. A member of the team will go through a full safety form with the participant prior to the scan. Some of these reasons are listed below:
• Pacemakers or implantable heart devices, including wires or valves
• Clips or implants from previous surgeries
• Stimulatory implants for neurological conditions
• Injuries involving metal, like shrapnel or metal dust
• Certain bodily piercings
• Certain dental implants and bridges
• Tattoos and medication patches in certain locations

MR scans can be loud and claustrophobic, which can be distressing. The nature of the scan and what they will experience will be fully explained to participants during the informed consent process, and they will be instructed to wear appropriate hearing protection. The participants ability to stop the scan if they feel uncomfortable will be emphasised during the consent process and by the team at their research scan.

Gadolinium can cause side effects: these are usually mild and do not last long. These include pain around where the contrast is injected, nausea, vomiting, or a headache. People may also experience skin sensations such as burning, tingling, or itching. Allergic reaction to gadolinium contrast is rare but does happen. This can range from a mild rash to difficulty breathing with swelling of the airway (anaphylaxis). Participants who are receiving gadolinium will be monitored throughout the scan to monitor for these side effects.

In very rare cases, administration of gadolinium to people with reduced kidney function has been associated with a condition called nephrogenic systemic fibrosis. Gadolinium can also deposit in very small amounts in the body, including the brain, after administration. The consequences of these depositions are currently unknown.

The team will endeavour to schedule the research scan on the same day as routine clinical care for the participant, including their clinical imaging studies. If this is not possible, the participant's travel costs to and from the site will be funded to ensure that the participation in the research does not incur financial cost.

Where is the study run from?
The study is run from the University of Oxford's Oxford Centre for Integrative Neuroimaging (UK).

When is the study starting and how long is it expected to run for?
July 2026 to October 2026.

Who is funding the study?
Cancer Research UK.

Who is the main contact?
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Additional identifiers

Integrated Research Application System (IRAS)
358170

Study information

Scientific Title
Evaluation of pre-operative ultra-high field magnetic resonance imaging for planning skull base tumour resection

Acronym
ATLAS

Study objectives

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 05/01/2026, Leicester South Research Ethics Committee (The Old Chapel, Royal Standard Place, Nottingham, NG1 6FS, United Kingdom; +44 207 104 8104; Leicestersouth.rec@hra.nhs.uk), ref: 25/EM/0265

Primary study design
Interventional

Allocation
N/A: single arm study

Masking
Open (masking not used)

Control
Uncontrolled

Assignment
The participants will be assigned to contrast or non-contrast scans based on safety and participant preference

Purpose
Basic science, Device feasibility, Diagnostic

Study type(s)

Health condition(s) or problem(s) studied
People with brain tumours of the skull base

Interventions
One 7 Tesla MRI scan session, which will image the brain and its surrounding structures. Optional intravenous injection of gadolinium.

Intervention Type
Other

Primary outcome(s)
1. To compare preoperative planning utility of TOF-MRA imaging at 7T to CT imaging for skull base tumours measured using quantitative image metrics and radiological reporting at after recruitment, data acquisition, and analysis

Key secondary outcome(s)
1. To compare structural tumour features between clinical (1.5T and 3T) and research (7T) T1 and T2 weighted imaging measured using quantitative image metrics and radiological reporting at after recruitment, data acquisition, and analysis

2. To compare the performance of skull base bone imaging between clinical (CT) and research (7T MR) imaging technique measured using quantitative image metrics and radiological reporting at after recruitment, data acquisition, and analysis

3. To compare vessel visualisation for TOF-MRA imaging with and without gadolinium enhancement measured using quantitative image metrics at after recruitment, data acquisition, and analysis

4. To compare deep learning and conventional reconstruction methods for reconstructing under-sampled TOF-MRA data at 7T which contains pathology measured using quantitative image metrics at after recruitment, data acquisition, and analysis.

Completion date
01/10/2026

Eligibility

Key inclusion criteria
1. Willing and able to give informed consent for participation in the trial
2. Male or Female, aged 18 years or above
3. In the Investigator's opinion, is able and willing to comply with all trial requirements
4. Awaiting or have received a CT scan and/or a clinical MR scan before elective surgical resection of an intracranial tumour of the skull base

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
120 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. Existing contraindication to MR scanning - including but not restricted to metal implants, pacemaker in situ that is not MR safe, or severe claustrophobia
2. Participants whose tumour is growing at a rate such that significant interval anatomical change will occur between research MR and CT scans, as assessed by Mr Jeyaretna (consultant skull base neurosurgeon) in preoperative clinics
3. Participants who have severe claustrophobia
4. Participants who are pregnant

Date of first enrolment
20/07/2026

Date of final enrolment
01/10/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Oxford University Hospitals
John Radcliffe Hospital
Headley Way
Headington
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Sponsor information

Organisation
University of Oxford

ROR
https://ror.org/052gg0110

Funder(s)

Funder type

Funder Name
Cancer Research UK

Alternative Name(s)
CR_UK, Cancer Research UK - London, Cancer Research UK (CRUK), CRUK

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available