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Monitoring hearing in patients undergoing platinum-based chemotherapy

Submission date
15/02/2022

Recruitment status
No longer recruiting

Registration date
06/04/2022

Overall study status
Completed

Last Edited
14/02/2024

Condition category
Cancer

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Hearing loss is a serious and potentially irreversible side-effect of platinum-based chemotherapy. Current management involves changing or reducing chemotherapy medications if hearing loss is detected. However, early detection is difficult as it currently relies on hearing tests performed in sound-proof booths in Audiology Departments when patients report symptoms of hearing loss or tinnitus (ringing in the ears). This is problematic since arranging such tests adds to the onerous schedule for cancer patients and hearing loss may be only detected after irreversible damage has already occurred. This study aims to investigate the feasibility of:
1. Monitoring hearing more closely throughout chemotherapy treatment in the cancer department itself using soundproof headphones and a tablet-based hearing test that is partly self-administered.
2. Measuring prestin and otolin-1 blood levels as possible markers of impending hearing loss from scheduled blood tests to help predict which patients are likely to develop hearing loss.

Who can participate?
Patients aged 13-40 years treated with platinum-based chemotherapy for bone sarcomas or testicular cancer at the University College London Hospital Macmillan Cancer Centre and St Bartholomew's Hospital will be invited to participate. To be able to take part, patients must have normal hearing at the start of chemotherapy and no history of middle ear disease or previous platinum-based chemotherapy.

What does the study involve?
Patients will receive their cancer treatment as per usual by their own medical teams and have a routine hearing test in the Audiology Department at the beginning and end of their chemotherapy treatment. Patients that have consented to take part in the study will be visited by the audiologist or clinical research practitioner during routine cancer hospital appointments or in the hospital ward. These visits are scheduled at the start of chemotherapy, before and after each chemotherapy cycle and finally 2 weeks after completion of chemotherapy treatment. During the visits, the patients will be asked and supported to undertake the tablet-based hearing test and an automatic hearing test called the distortion production otoacoustic emission (DPOAE) test. During the the first and last visits patients will also be asked to complete quality

of life questionnaires. Those who experience tinnitus will be asked to complete a questionnaire. For patients with sarcoma, from their routine blood tests (taken five times throughout treatment) samples will also be processed for prestin and otolin-1 levels.

What are the possible benefits and risks of participating?
Participants will have their hearing tested more frequently than standard. Of potential benefit, the study may raise earlier concerns about hearing loss, tinnitus, or loud sounds. The research team will support the participants throughout the study and will ensure discussion of hearing test results with the and the medical team throughout.

Where is the study run from?
University College London (UK)

When is the study starting and how long is it expected to run for?
September 2020 to April 2024

Who is funding the study?
Action on Hearing Loss (UK)

Who is the main contact?
Prof. Nish Mehta
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Contact information

Type(s)
Principal investigator

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Integrated Research Application System (IRAS)
271954

Central Portfolio Management System (CPMS)
44553

Protocol serial number
126790

Study information

Scientific Title
Monitoring ototoxicity in patients undergoing treatment with platinum-based chemotherapy for sarcoma and testicular cancer using tablet-based self-administered audiometry and serum biomarkers

Study objectives
The study addresses the following main questions:
1. Is it feasible to conduct out-of-booth tablet-based self-administered audiometry to monitor ototoxicity in patients undergoing treatment with platinum-based chemotherapy for sarcoma and testicular cancer?
2. Can prestin and otolin-1 be used as a biomarker for platinum-based chemotherapy-induced ototoxicity?

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 01/10/2020, London - Camberwell St Giles Research Ethics Committee (Level 3, Block B, Whitefriars, Lewins Mead, Bristol, BS1 2NT, UK;
+44 (0)2071048103; nrescommittee.london-camberwellstgiles@nhs.net), ref :19/LO/1988

Study design
Observational longitudinal study

Primary study design
Observational

Study type(s)
Diagnostic

Health condition(s) or problem(s) studied
Platinum-based chemotherapy for sarcoma or testicular cancer

Interventions
Tablet-based self-administered audiometry (TBSA) and distortion product otoacoustic emissions (DPOAE) will be conducted in a quiet room at the hospital. Ambient noise levels in the room will be recorded to ensure they do not exceed 40 dBSPL on average across the tested frequencies (500Hz, 1000Hz, 2000Hz, 4000Hz and 8000Hz). Tablet-based hearing tests that are partly self-administered and DPOAE tests will be performed at baseline, directly before and after each chemotherapy cycle and at a final visit 2-4 weeks after cycle 4. TBSA involves the Shoebox mobile device (iPad) with inbuilt calibrated audiometry. This equipment can be easily moved depending on where the participant is i.e., in the ward, or at their day-care appointment. TBSA includes the test frequencies: 250Hz, 500Hz, 1000Hz, 2000Hz, 3000Hz, 4000Hz, 6000Hz, 8000Hz, 10000Hz, 12500Hz and 16000Hz. The audiologist places the circum-aural headphones onto the patient's ears to ensure that they are correctly placed. Supported by the researcher, the participant uses the iPad screen to demonstrate whether they hear the stimuli. There is a touch “play” button that needs to be dragged into one of two options, the “heard” option or “unheard” which are depicted by green and red symbols respectively. The participant is reminded that not

every press of the play button will present a sound i.e., sometimes it will and sometimes it will not. The researcher observes the participant's use of TBSA and records the time taken to complete the TBSA. DPOAE testing with the Otodynamics Otoport Flexi OAE device involves the use of a small soft probe that is inserted into the patient's ear. The patient is advised to remain still and quiet for this test. The total testing time is approximately 30 minutes.

Intervention Type
Device

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Tablet-based self-administered audiometry

Primary outcome(s)
Proportion of patients that are compliant with the planned tablet-based self-administered audiometry schedule measured at each scheduled study visit (i.e., baseline, pre-cycle, and post-cycle and at a final visit 2-4 weeks after their final cycle)

Key secondary outcome(s))
1. Changes in pure-tone and high-frequency hearing levels measured using TBSA from baseline to scheduled study visits at the day before and at day 3 of each chemotherapy cycle and at a final visit 2-4 weeks after the final cycle
2. Changes in distortion product otoacoustic emissions (DPOAE) measured with handheld OAE device, Otoport Flexi OAE, from baseline to scheduled study visits at the day before and at day 3 of each chemotherapy cycle and at a final visit 2-4 weeks after the final cycle
3. Changes in hearing-related quality of life (QoL) measured with the HEAR-QL and Tinnitus Functional Index (TFI) at baseline, pre- and post-cycle (if participant reports a history of tinnitus within 2 weeks of visit), and at a final visit 2-4 weeks after the final cycle. Please note TFI is only measured in adults. There is no equivalent for children and adolescents, therefore will not be measured in this age group
4. For sarcoma patients only, serum prestin and otolin-1 levels measured in blood samples taken at baseline, pre- and post-cycle and at a final visit 2-4 weeks after the final cycle

Completion date
30/04/2024

Eligibility

Key inclusion criteria
1. Patients diagnosed with sarcoma (male or female) or testicular cancer (male) and selected for platinum-based chemotherapy
2. Aged between 13 and 40 years
3. Able to provide informed consent
4. Able to understand and cope with the use of headphones and self-administered hearing assessments (as assessed by the researcher at informed consent)
5. No recent history of ear disease, e.g., acute otitis media, otitis media with effusion, middle ear surgery
6. Hearing at screening better than 40 dB across the following frequencies: 0.25, 0.5, 1, 2, 4 and 8 kHz

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Sex
All

Total final enrolment
23

Key exclusion criteria
1. Prior platinum-based chemotherapy within 5 years prior to study cycle 1, day 1
2. Abnormalities of the external or middle ear revealed by otoscopy at screening: otitis externa, otitis media, visible tympanic membrane perforation
3. Conductive hearing loss, a ‘true’ air-bone gap ≥15 dB HL in three or more contiguous frequencies between 0.5, 1, 2, 4 kHz

Date of first enrolment
14/04/2021

Date of final enrolment
31/12/2022

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
The University College Hospital Macmillan Cancer Centre - UCLH Trust
Huntley St
London
United Kingdom
WC1E 6AG

Study participating centre
St Bartholomew's Hospital - Barts Health NHS Trust
W Smithfield
London

United Kingdom
EC1A 7BE

Sponsor information

Organisation
University College London

ROR
https://ror.org/02jx3x895

Funder(s)

Funder type
Charity

Funder Name
Action on Hearing Loss

Alternative Name(s)

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
The datasets generated during and/or analysed during the current study are not expected to be made available.

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?

HRA research summary			28/06/2023	No	No
Participant information sheet	Adults version 1.3	24/08/2020	24/03/2022	No	Yes
Participant information sheet	Young people (aged 13-15 years) version 1.2	24/08/2020	24/03/2022	No	Yes
Study website	Study website	11/11/2025	11/11/2025	No	Yes