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Antibiotic (cefuroxime) levels after caesarean section

Submission date	Recruitment status	[X] Prospectively registered
03/08/2020	Recruiting	[X] Protocol
Registration date	**Overall study status**	[_] Statistical analysis plan
26/10/2020	Ongoing	[_] Results
Last Edited	**Condition category**	[_] Individual participant data
29/07/2024	Infections and Infestations	[_] Record updated in last year

Plain English summary of protocol

Background and study aims
A caesarean section, or C-section, is an operation to deliver a baby through a cut made in the tummy and womb. Doctors and pharmacists at Birmingham Women's Hospital and the University of Birmingham, School of Pharmacy are investigating how the body mass index of the woman affects the concentration of the standard antibiotic (cefuroxime) given to women before having a Caesarean section. They are particularly interested in the concentration of antibiotic in the blood and at the site of incision (tummy).

Who can participate?
Healthy women who are experiencing a normal pregnancy. The researchers are interested in women with a range of body mass index values so that they know as much as possible about cefuroxime concentrations. As this is a pilot study a limited budget prevents them from providing translation services for those participants unable to read and understand English. Participation has no direct benefits to participants thus exclusion on this basis does not affect the standard of care provided.

What does the study involve?
The researchers will need to use information from participants and from their medical records for this research project. This information will include initials, name, contact details, body mass index (related to height and weight), details of the drugs used during caesarean section, and general details about health at the time of caesarean section. People at Birmingham Women's Hospital will use this information to do the research or to check their records to make sure that the research is being done properly.
People who do not need to know will not be able to see participants' names or contact details. The data will have a code number instead. Some of this information and the blood and fat samples will be transferred to the University of Birmingham, this information and the samples will use a coded number and there will be no identifiable information that is transferred to the University of Birmingham. The researchers will keep all information safe and secure.
The researchers also ask permission from participants to take three blood samples (each one of less than 10 ml (two teaspoons) and two small samples of fat from their tummy during the caesarean section. The first sample of blood will be taken at the time of skin incision. After the operation, they will need to take another blood sample as close to the time of delivery as

possible and the final blood sample will be taken in the recovery room. The samples will either be taken from a cannula inserted in hand, the insertion of the cannula will be uncomfortable, or the samples taken by a very small ‘butterfly’ needle from hand or foot. If the samples are taken from foot this will be numb from the anaesthetic and will not hurt.
Just before the baby is delivered, the researchers will ask the doctor to remove a small amount of the fat from under the skin on the participant's tummy. This will be a very small amount (about the size of a 50p coin). During C-section, participants will have an anaesthetic so they should not feel any pain. The doctor will deliver the baby and placenta then stitch the womb. Just before the skin is stitched, the doctor will remove a second 50p sized sample of fat. Taking these small fat samples will take less than a minute each so the overall procedure is only a maximum of 2 minutes longer than without the fat samples. As well as the samples taken on the day of C-section the researchers will ask permission from participants to contact them by telephone between 30-40 days after their C-section to ask a few questions and to find out if they have had an infection.

What are the possible benefits and risks of participating?
There are no direct health benefits to participants. The findings from this study will help to determine the appropriate antibiotic dosing strategy used in future for patients with a high BMI that need a C-section. The researchers do not believe that there are any major disadvantages or risks of taking part in this study. The additional procedures that participants will receive are (i) insertion of an additional cannula for the taking of three additional blood samples and (ii) the removal of two samples of fat. The blood will be taken by a trained healthcare professional using standard methods to take blood; the risks associated with taking blood samples are minimal. The samples of fat will be taken from participants whilst the skin is open for the C-section; they will be anaesthetized so will not feel any pain from this process. The amount of fat taken is small (about the size of a 50p coin) and this will not lead to visible differences to participants’ body following C-section. Participants can stop being part of the study at any time, without giving a reason, but the researchers will keep information about participants that they already have.

Where is the study run from?
University of Birmingham, School of Pharmacy and Birmingham Women’s Hospital (UK)

When is the study starting and how long is it expected to run for?
January 2018 to December 2025

Who is funding the study?
The Saudi Arabian Government (Royal Embassy of Saudi Arabia, Cultural Bureau in London)

Who is the main contact?
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Contact information

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Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
244803

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
v0.4, IRAS 244803

Study information

Scientific Title
Prophylactic perioperative cefuroxime levels in plasma and adipose tissue at the time of caesarean section (C-LACE): a pilot experimental, prospective study with non-probability sampling to determine interpatient variability

Acronym

C-LACE

Study objectives
This study will analyse cefuroxime concentration in plasma and adipose tissue samples to accurately measure levels achieved in non-obese and obese pregnant women undergoing caesarean section to confirm if therapeutical cefuroxime levels are reached in plasma and adipose tissue.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 22/01/2020, Health Research Authority (HRA) and Health and Care Research Wales (HCRW) (East Midlands - Leicester Central Research Ethics Committee, The Old Chapel Royal Standard Place, Nottingham, NG1 6FS, UK; +44 (0)207 972 2568; HRA.Approval@nhs.net), ref:19/EM/0356

Study design
Single-centre experimental prospective pilot study with non-probability sampling

Primary study design
Observational

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Cefuroxime concentration in plasma and adipose tissue (within the incision) at time of skin incision and skin closure in obese and non-obese pregnant patients requiring caesarean section

Interventions
This study will measure the concentration of cefuroxime in adipose tissue (two samples from site of incision) and blood (three samples) from pregnant women undergoing scheduled caesarean section. Analysis will explore the impact of BMI (body mass index) on cefuroxime concentration. The study participants will be followed up between 30 and 40 days post caesarean section to record details of any post-caesarean infection to explore correlations in BMI:measured cefuroxime concentrations and post caesarean infection rates.

Intervention Type
Other

Primary outcome(s)
Time above the Minimum Inhibitory Concentrations (T>MIC): the MIC is not harmonised between guidelines, thus the time above the T>MIC will be reported for MIC values of 1, 4 and 8 mg/l as these values correlate to the most common bacteria involves in post-CS surgical infections. The analytical method used to measure cefuroxime is LC-MS/MS (Liquid Chromatography with tandem mass spectrometry). At time of caesarean section, five samples will be collected: one blood sample at time of skin incision, one blood sample at time of skin closure, one blood sample at recovery room (<3 hours following CS), one adipose tissue sample (approximately 1 cm from the skin in the middle of the Pfannenstiel or vertical midline incision) at skin incision and one adipose tissue sample (from a similar location to sample 1) just prior to skin closure.

Key secondary outcome(s))
The rate of surgical site infection as per the definitions set out by the US Centers for Disease Control and Prevention (2019). The participants will be contacted at 30-40 days post-CS to record any incidence of infection occurred from day 1 of CS until the time of the contact.

Completion date
01/12/2026

Eligibility

Key inclusion criteria
1. Pregnant women 18 years to 50 years old, with a singleton pregnancy undergoing elective CS at 37 weeks or over
2. Participant is able to give consent and agree to sample storage
3. Participant agrees to be contacted for follow-up
4. Participant contributing to the study needs to be able to read and/or understand English

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Upper age limit
50 years

Sex
Female

Key exclusion criteria
1. Multiple pregnancy
2. Previous CS that resulted in a surgical site infection
3. Emergency CS
4. Any non-elective CS including those requiring early delivery without threat to maternal or foetal health that were not previously planned
5. Body Mass Index (BMI) less than 18 kg/m2 or greater than or equal to 45 kg/m2 (at time of first pregnancy appointment and at time of delivery)
6. Participant contributing to the study is unable to read and/or understand English
7. Currently enrolled in a randomized controlled trial for an intervention to reduce postoperative surgical site infection
8. Diabetes (type 1, type 2 or gestational)
9. Hypertension
10. Renal disease
11. Cardiovascular disease (e.g. maternal structural cardiac disease)

12. Liver disease
13. Inflammatory bowel disease (e.g. Crohn’s disease or ulcerative colitis)
14. Cephalosporin or penicillin allergy
15. Administration of antibiotic within 1 week prior to delivery
16. Suspected pre-existing infection (including chorioamnionitis)
17. Autoimmune disease (e.g. systemic lupus erythematosus, rheumatoid arthritis)
18. Chronic use of corticosteroid
19. History of wound breakdown in an abdominal surgery
20. Prior laparotomy for any indication (e.g. Previous ovarian cystectomy or previous bowel surgery)

Date of first enrolment
01/12/2024

Date of final enrolment
01/09/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Birmingham Women’s Hospital (part of Birmingham Women’s and Children’s Hospital NHS Foundation Trust)
Mindelsohn Way
Birmingham
United Kingdom
B15 2TG

Sponsor information

Organisation
University of Birmingham

ROR
https://ror.org/03angcq70

Funder(s)

Funder type
Government

Funder Name
Saudi Arabian Government, Royal Embassy of Saudi Arabia, Cultural Bureau in London

Results and Publications

Individual participant data (IPD) sharing plan
Individual de-identified participant data (IPD) will be stored in a non-publically available repository (Bear Share: https://intranet.birmingham.ac.uk/it/teams/infrastructure/research/bear/BEARDataShare/BEARDataShare.aspx). Direct access will be granted to authorised representatives from the Sponsor and host institution for monitoring and/or audit of the study to ensure compliance with regulations. Data will be stored at this site for 10 years in accordance with the regulations of the University of Birmingham. This anonymised data will be shared in publications that result from this study, most likely as supplementary information to the manuscript.

IPD sharing plan summary
Stored in non-publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol article	protocol	18/02/2021	22/02/2021	Yes	No
HRA research summary			28/06/2023	No	No
Participant information sheet	version V0.4	26/12/2019	26/10/2020	No	Yes