

# Study of correlation between the extent of spread of cerebro-spinal fluid measured using Magnetic Resonance Imaging and the severity of headache following accidental dural puncture during epidural catheter placement for labour analgesia

<b>Submission date</b> 18/12/2017	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 08/01/2018	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 22/01/2021	<b>Condition category</b> Pregnancy and Childbirth	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

In the UK 1 in 3 women choose an epidural for pain relief during childbirth, as it remains the most effective choice. Pain sensation is conveyed to the brain via nerves that are connected through the spinal cord, which floats in a bag of fluid (dural sac) further protected inside a hollow bony column (vertebral column). The dural sac contains fluid (cerebrospinal fluid or CSF), and its coverings are made of three layers of membranes (dura mater, arachnoid mater and pia mater). The spinal cord is connected directly with the brain, and the dural sac and covering membranes continue upwards in the skull to enclose the brain. Epidural involves placement of a plastic tube by an anaesthetic doctor, through a needle, into a space that lies between the outermost membrane of the sac and the wall of the bony canal (epidural space). In an uncomplicated procedure, this placement of the plastic tube is achieved without puncturing the membranes. However, in 1% cases, the dura may get punctured by the needle leading to the leakage of spinal fluid. It is believed that such a leakage causes traction on the membranes producing headache in 80% of women (called postdural puncture headache or PDPH). If severe this may require an invasive procedure (called an epidural blood patch or EBP) for effective treatment. PDPH can be very incapacitating and debilitating for the new mother; restricting daily activities, impairs looking after her baby, impedes mother-baby bonding and can delay discharge from hospital. In simple terms, PDPH can turn an enjoyable experience into an unpleasant one, with substantial physical, emotional and psychological consequences. Currently, there is no scientific investigative tool that can predict the development, progress and severity of PDPH. Current management relies on a "wait and watch" strategy. This has serious limitations, including unnecessary suffering for the new mother by delayed diagnosis, potentially delayed definitive treatment (EBP), and premature discharge with subsequent readmission. Magnetic resonance imaging (MRI) is a routine investigation tool, frequently used in other fields of

medicines (neurology, neurosurgery etc), that can provide high resolution images of spinal cord, its surrounding membranes, spinal fluid and its leakage into the epidural space. This study will be the first attempt to scientifically evaluate the link between features identified on MRI images taken soon after accidental puncture of the dura, and the development, progress and severity of ensuing headache. This may help clinicians to reliably identify the patients at risk of developing more severe headache and offer early institution of effective treatment (EBP), on the basis of scientific evidence instead of the current “wait, watch and intervene” strategy. The aim of this study is to help reduce unnecessary suffering for the new mother and minimise the disruption to family life due to PDPH.

**Who can participate?**

Adult woman aged 16 and older in labour who received an epidural/CSE for pain relief and sustained an observed ADP with an epidural needle.

**What does the study involve?**

After recognition of an accidental dural puncture the participant is managed according to the local protocols. Once the baby is delivered and both the mother and the newborn are in reasonably good health, the mother are approached by a member of the direct care team, who explores her potential participation in the study. The local investigator liaises with the local radiology department to arrange an MRI scan as soon as possible, but no later than 24 hours from the detection of ADP. The local investigator accompanies the mother to the MRI scanner. Once the MRI scan is done the mother continues to be managed according to the local protocols. The direct care team are not informed about the MRI scan findings. All the participating women are followed up for the development of PDPH daily for 1 week in person or over the telephone. A follow-up questionnaire is used by the local investigators (LI) for data collection and follow up.

**What are the possible benefits and risks of participating?**

There are no benefits or risks with participating.

**Where is the study run from?**

This study is being run by University College London Hospitals NHS Foundation Trust (UK) and takes place in hospitals in the UK.

**When is the study starting and how long is it expected to run for?**

January 2012 to March 2018

**Who is funding the study?**

National Institute of Academic Anaesthesia (UK)

**Who is the main contact?**

Dr Amer Majeed

## **Contact information**

**Type(s)**

Scientific

**Contact name**

Dr Amer Majeed

**ORCID ID**

<https://orcid.org/0000-0003-2255-6950>

### **Contact details**

Consultant Anesthesiologist  
King Faisal Specialist Hospital and Research Centre  
Riyadh  
Saudi Arabia  
11211

## **Additional identifiers**

### **Protocol serial number**

14310

## **Study information**

### **Scientific Title**

Does Magnetic Resonance Imaging (MRI) correlate with severity of headache following accidental dural puncture (ADP) during epidural catheter placement for labour analgesia?

### **Acronym**

MRiADP

### **Study objectives**

There is a positive correlation between the extent of spread of cerebro-spinal fluid measured using Magnetic Resonance Imaging and the severity of headache following accidental dural puncture during epidural catheter placement for labour analgesia.

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

National Research and Ethics Service Committee North West - REC, 23/07/2012, ref: 12/NW/0528

### **Study design**

Interventional; Design type: Diagnosis, Imaging

### **Primary study design**

Interventional

### **Study type(s)**

Treatment

### **Health condition(s) or problem(s) studied**

Specialty: Reproductive health and childbirth, Primary sub-specialty: Reproductive and Sexual Medicine; UKCRC code/ Disease: Reproductive Health and Childbirth/ Complications of labour and delivery

### **Interventions**

Participants receiving epidurals for labour analgesia, who sustain an accidental dural puncture (ADP), would undergo clinical management according to the local departmental protocols as usual. If they agree to participate in this study, they would undergo Magnetic Resonance Imaging (MRI) of their brain and lumbar spine, without contrast, within 48 hours from the occurrence of the ADP. They are also followed up for one week for development of symptoms associated with Post Dural Puncture Headache (PDPH). The images and follow up data are pseudoanonymised. These are then reported and analysed by the study neuro-radiologist and the study coordinator respectively.

## **Intervention Type**

Other

## **Primary outcome(s)**

Presence, or otherwise, of a statistically significant positive correlation between the extent of spread of cerebro-spinal fluid measured using Magnetic Resonance Imaging and the severity of PDPH according to a carefully designed scoring system developed by the study team.

## **Key secondary outcome(s))**

Incidental findings on the images measured using Magnetic Resonance Imaging.

## **Completion date**

31/03/2018

# **Eligibility**

## **Key inclusion criteria**

All adult (>16 years of age) women in labour who received an epidural / CSE for pain relief and sustained an observed ADP with an epidural needle.

## **Participant type(s)**

Patient

## **Healthy volunteers allowed**

No

## **Age group**

Adult

## **Sex**

Female

## **Total final enrolment**

30

## **Key exclusion criteria**

1. Patient refusal
2. Unsuitable for MRI (e.g. metal implants, pace maker etc)
3. Pre-existing headaches / migraine, spinal surgery
4. Spine deformity or anomalies

**Date of first enrolment**

01/09/2013

**Date of final enrolment**

08/02/2017

## **Locations**

**Countries of recruitment**

United Kingdom

England

**Study participating centre**

**University College London Hospitals NHSFT**

London

United Kingdom

NW1 2BU

**Study participating centre**

**Stoke Mandeville Hospital**

Mandeville Road

Aylesbury

United Kingdom

HP21 8AL

**Study participating centre**

**St Mary's Hospital**

Manchester

United Kingdom

M13 9WL

**Study participating centre**

**Kings College Hospital NHSFT**

London

United Kingdom

SE5 9RS

**Study participating centre**

**Royal Preston Hospital**  
Preston  
United Kingdom  
PR2 9HT

**Study participating centre**  
**Royal Berkshire NHSFT**  
Reading  
United Kingdom  
RG1 5AN

**Study participating centre**  
**University Hospitals Coventry and Warwickshire NHST**  
Coventry  
United Kingdom  
CV2 2DX

## **Sponsor information**

**Organisation**  
University College London Hospitals NHS Foundation Trust

**ROR**  
<https://ror.org/042fqyp44>

## **Funder(s)**

**Funder type**  
Government

**Funder Name**  
National Institute of Academic Anaesthesia

## **Results and Publications**

### **Individual participant data (IPD) sharing plan**

The data sharing plans for the current study are unknown and will be made available at a later date.

## IPD sharing plan summary

Data sharing statement to be made available at a later date

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	results	01/01/2021	22/01/2021	Yes	No
<a href="#">Participant information sheet</a>	version V5.1	22/06/2015	08/01/2018	No	Yes
<a href="#">Participant information sheet</a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes
<a href="#">Protocol file</a>	version V8.1	12/06/2016	08/01/2018	No	No