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Testing for bile duct stones before gallbladder surgery

Submission date
24/09/2018

Recruitment status
No longer recruiting

Registration date
02/10/2018

Overall study status
Completed

Last Edited
08/01/2026

Condition category
Surgery

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

Plain English summary of protocol

Background and study aims
Surgery to remove the gallbladder is required if it contains gallstones that cause problems. About 70,000 operations are performed annually in England. Sometimes, gallstones cause other problems if they pass from the gallbladder into the nearby bile duct (e.g. jaundice/inflammation of the pancreas). If this happens, it is necessary to remove the bile duct stones before or during the gallbladder operation. Because of this, patients requiring gallbladder surgery are assessed for any risk of bile duct stones. If the risk is high, further tests are done to identify if bile duct stones are present. If the risk is moderate or low (although it can be difficult to distinguish between the two), then it is uncertain whether further tests to look for bile duct stones are necessary. As a result, some surgeons choose to perform tests and others don't. A UK-wide research study found that a third of patients undergoing gallbladder surgery were tested, usually before surgery using an MRI scanner. This test, called a Magnetic Resonance Cholangiopancreatography (MRCP), involves a 1-hour visit to hospital and costs the NHS about £365. The MRCP identifies bile duct stones but may delay gallbladder surgery which can lead to increased problems with gallstones whilst waiting. There are other uncertainties about the need for testing using MRCP. Even if the MRCP shows bile duct stones, the stones can pass into the bowel spontaneously; and removing the stones can cause complications. Not having the MRCP avoids these risks, but can lead to bile duct stones being left behind after surgery, which may also cause complications. Research to establish if going straight to gallbladder surgery without testing the bile duct beforehand is needed.
The Sunflower Study will find out whether testing for bile duct stones with MRCP before gallbladder surgery is worthwhile or not in patients with a low or moderate risk of having stones.

Who can participate?
Adults with symptomatic gallstone disease who are scheduled and fit to receive gallbladder surgery, with a low to moderate risk of common bile duct stones

What does the study involve?
Participants in the Sunflower study will be divided into two groups. One group will go straight to surgery (i.e. no additional testing) and the other will receive an MRCP before surgery. The groups will be selected by a process called randomisation to ensure that groups have similar patients in terms of factors such as general health, age and gender. The 'straight to surgery'

group will have twice as many people in as the ‘tested’ group to reduce the number of extra MRCPs performed. Both groups will be followed for 18 months and information about the need for treatment of bile duct stones, complications of surgery and costs collected.

What are the possible benefits and risks of participating?
For participants who receive MRCP, the possible benefit of participating is that this procedure may detect and, if needed, treat problematic bile duct stones. However for participants who do not receive MRCP, the possible benefit is that this allows their gallbladder surgery to go ahead immediately, without the possible disadvantages of testing for bile duct stones.
For participants who receive MRCP, the possible risks of participating is that the procedure may be unnecessary, as bile duct stones often pass safely and spontaneously into the bowel. Additionally, in 10-20% of cases, MRCP may not detec bile duct stones. Additionally, some patients may experience claustrophobia during the scan. For some patients, the scan and endoscope procedure (if required) may lead to a longer wait time for gallbladder surgery, which can lead to problems with gallstones whilst waiting (however, the surgery may not always be delayed by this).
For participants who do not receive MRCP, the possible risk is that any bile duct stones present will not be detected, which could lead to problems after gallbladder surgery (i.e. jaundice, infection, pancreatitis) and therefore require further treatment or readmission to hospital. If bile duct stones are suspected later, a scan and potentially endoscope procedure will be likely needed to remove them.

Where is the study run from?
Leeds Teaching Hospitals NHS Trust and at least 50 hospitals throughout the UK.

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

Who is funding the study?
National Institute for Health Research (NIHR) Health Technology Assessment Programme (UK)

Who is the main contact?
Stephen Palmer
sunflower-study@bristol.ac.uk

Contact information

Type(s)
Public

Contact name
Mr Stephen Palmer

Contact details
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United Kingdom

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
16/142/04

Study information

Scientific Title
The Sunflower Study: A randomised controlled trial to establish the clinical and cost effectiveness of expectant management versus pre-operative imaging with MRCP in patients with symptomatic gallstones undergoing laparoscopic cholecystectomy at low or moderate risk of common bile duct stones

Acronym
The Sunflower Study

Study objectives
We will test the hypothesis that expectant management is non-inferior to magnetic resonance pancreaticogram (MRCP) with respect to hospitalisation for treatment for a complication of gallstones up to 18 months after randomisation.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 10/12/2018, Yorkshire & The Humber – South Yorkshire Ethics Committee (NHSBT Newcastle Blood Donor Centre, Holland Drive, Newcastle upon Tyne, NE2 4NQ; Tel: +44 (0)207 1048091; Email: nrescommittee.yorkandhumber-southyorks@nhs.net), ref: 18/YH/0358

Study design
Interventional multi-centre pragmatic randomized controlled trial with an internal pilot phase (Phase I) and a quintet recruitment intervention (QRI)

Primary study design
Interventional

Study type(s)
Diagnostic

Health condition(s) or problem(s) studied

Symptomatic gallbladder disease, requiring gallbladder surgery

Interventions
Participants will be randomly allocated in a 1:2 ratio to receive either a reoperative magnetic resonance pancreaticogram (magentic resonance cholangiopancreatography - MRCP) or no MRCP (expectant management) using an online system.
In the MRCP arm, participants will undergo an MRCP prior to their gallbladder surgery. An MRCP takes on average 20-30 minutes. In the expectant management arm, participants will proceed directly to surgery without undergoing an MRCP. The follow up will be the same in both groups – a 20% sample will be asked to complete questionnaires at 3, 6, 12 and 18 months post randomisation.

Intervention Type
Other

Primary outcome(s)
Current primary outcome measure:
Any of the following:
1. Any hospital admission within 18 months of randomisation for treatment of complications of gallstones whether in the CBD or gallbladder
2. Complications during the admission for LC for the treatment for gallstones or any readmission for complications of the LC leading to a hospital stay of >2 days. Complications will include, but not be limited to:
2.1. Return to theatre post LC for any cause
2.2. Percutaneous radiological drainage
2.3. ERCP for non-diagnostic reasons (e.g. for a bile leak). It does not include a diagnostic ERCP performed following an MRCP where CBD stones were identified.
3. Complications during any ERCP for the treatment for gallstones. Complications will include:
3.1. Blood transfusion post ERCP
3.2. Percutaneous radiological drainage
3.3. Treatment of a perforation occurring during ERCP
3.4. Acute pancreatitis
3.5. Other complications leading to a hospital stay of >2 days
This will be acquired from routine data sources, such as HES data from NHS Digital in England. The HES data will be reviewed and specific OPCS-4 and ICD-10 codes will be searched for. These codes identify specific diagnoses, procedures, etc which will form the primary outcome measure. This will be measured in the 18 months following randomisation.

Previous primary outcome measure:
Any of the following:
1. Any hospital admission within 18 months of randomisation for treatment of complications of gallstones whether in the CBD or gallbladder
2. Complications during the admission for LC for the treatment for gallstones or readmission for complications of the LC. Complications comprise:
2.1. Return to theatre post LC for any cause
2.2. Percutaneous radiological drainage
2.3. ERC
3. Complications during the index admission for ERCP for the treatment for gallstones (i.e. an ERCP performed following an MRCP where CBD stones were identified). Complications comprise:
3.1. Blood transfusion post ERCP
3.2. Percutaneous radiological drainage

3.3. Further ERCP
3.4. Treatment of a perforation occurring during ERCP
3.5. Acute pancreatitis
3.6. Respiratory complications leading to extended hospital stay of > 2 days
3.7. Cardiac complications leading to extended hospital stay of > 2 days
3.8. Infective complications leading to extended hospital stay of > 2 days
3.9. Other complications leading to extended hospital stay of > 2 days (detail to be recorded).
This will be acquired from routine data sources, such as HES data from NHS Digital in England. The HES data will be reviewed and specific OPCS-4 and ICD-10 codes will be searched for. These codes identify specific diagnoses, procedures, etc which will form the primary outcome measure. This will be measured in the 18 months following randomisation.

Key secondary outcome(s))
1. Health-related quality of life, assessed using the EQ-5D-5L questionnaire at time of randomisation, admission for LC and 3, 6, 12 and 18 months after randomisation (participants will not be asked to complete the admission for LC questionnaire if they have completed their baseline questionnaire within the previous two days)
2. Items in the LC core outcome set, which is due to be published at the end of 2018
3. NHS resource use to 18 months post randomisation, taken from routine data sources such as HES data from NHS Digital in England

Completion date
30/11/2025

Eligibility

Key inclusion criteria
Current inclusion criteria as of 15/01/2020:
1. Aged 18 years or older
2. Symptomatic gallbladder disease, confirmed by trans-abdominal ultrasound scan (USS) or computed tomography (CT) scan, including, for example:
2.1. Biliary colic
2.2. Cholecystitis
2.3. Mild and severe gallstone pancreatitis
2.4. Gallbladder polyps
2.5. Gallbladder dyskinesia, etc
3. Scheduled and fit for laparoscopic cholecystectomy (LC) as an elective or urgent procedure
4. Low or moderate risk of common bile duct (CBD) stones, including all of the following:
4.1. CBD diameter ≤8 mm on USS
4.2. Bilirubin ≤ 50umol/l
4.3. Alanine transferase less than three times the upper limit of normal (≤3 x ULN) and/or alkaline phosphatase ≤3 x ULN
If a patient does not meet the definition of low or moderate risk of CBD stones solely because both alanine transferase and alkaline phosphatase are > 3 x ULN, if repeat blood tests are carried out and at least one of the second or subsequent test results is within range (i.e. ≤ 3 x ULN) the patient may be recruited at that time.
If a patient does not meet the definition of low or moderate risk of CBD stones solely because bilirubin > 50umol/l, if repeat blood tests are carried out and at least one of the second or subsequent test results is within range the patient may be recruited at that time.
If CBD cannot be seen on USS or CT scan, the patient may be recruited as long as all the other inclusion criteria are met and there is no intrahepatic duct dilatation reported.

Previous inclusion criteria:
1. Aged 18 years or older
2. Symptomatic gallstone disease, confirmed by trans-abdominal ultrasound scan (USS) or computed tomography (CT) scan, including:
2.1. Biliary colic
2.2. Cholecystitis
2.3. Mild and severe pancreatitis
2.4. Gallbladder polyps
2.5. Gallbladder dyskinesia
3. Scheduled and fit for laparascopic cholecystectomy (LC) as an elective or urgent procedure
4. Low or moderate risk of common bile duct (CBD) stones, including all of the following:
4.1. CBD diameter ≤8 mm on USS
4.2. Bilirubin ≤ 50umol/l
4.3. Alanine transferase less than twice the upper limit of normal (≤2 x ULN) and/or alkaline phosphatase ≤2 x ULN.
If a patient does not meet the definition of low or moderate risk of CBD stones solely because both alanine transferase and alkaline phosphatase are > 2 x ULN, if repeat blood tests are carried out and at least one of the second or subsequent test results is within range (i.e. ≤ 2 x ULN) the patient may be recruited at that time.
If a patient does not meet the definition of low or moderate risk of CBD stones solely because bilirubin > 50umol/l, if repeat blood tests are carried out and at least one of the second or subsequent test results is within range the patient may be recruited at that time.
If CBD cannot be seen on USS or CT scan, the patient may be recruited as long as all the other inclusion criteria are met and there is no intrahepatic duct dilatation reported.

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 years

Upper age limit
100 years

Sex
All

Total final enrolment
7471

Key exclusion criteria
Current exclusion criteria as of 15/01/2020:
1. Unable to undergo MRCP
2. Evidence of empyema or perforated gallbladder requiring urgent intervention

3. Previous gastric bypass
4. Previous MRCP or endoscopic ultrasound (EUS) within last 3 months
5. Any previous ERCP
6. Haemolytic disease
7. Pregnancy
8. Unwilling to participate in follow up
9. Unable to provide written informed consent
10. Prisoner

Previous exclusion criteria:
1. Unable to undergo MRCP
2. Evidence of empyema or perforated gallbladder requiring urgent intervention
3. Previous duodenal bypass
4. Previous MRCP within last 3 months
5. Haemolytic disease
6. Pregnancy
7. Unwilling to participate in follow up
8. Unable to provide written informed consent
9. Prisoner

Date of first enrolment
01/12/2018

Date of final enrolment
30/08/2024

Locations

Countries of recruitment
United Kingdom

England

Northern Ireland

Scotland

Wales

Study participating centre
Leeds Teaching Hospitals NHS Trust
-
-
England
LS1 3EX

Study participating centre

Calderdale and Huddersfield NHS Foundation Trust
Huddersfield Royal Infirmary
Acre Street
Lindley
Huddersfield
England
HD3 3EA

Study participating centre
Nottingham University Hospitals NHS Trust
Queens Medical Centre Campus
Derby Road
Nottingham
England
NG7 2UH

Study participating centre
Worcestershire Acute Hospitals NHS Trust
Worcestershire Royal Hospital
Worcester
England
WR5 1DD

Study participating centre
North Bristol NHS Trust
Southmead Hospital
Bristol
England
BS10 5NB

Study participating centre
University Hospitals Bristol NHS Foundation Trust
Marlborough Street
Bristol
England
BS2 8HW

Study participating centre
Surrey and Sussex Healthcare NHS Trust
East Surrey Hospital
Canada Avenue

Redhill
England
RH1 5RH

Study participating centre
Countess of Chester Hospital NHS Foundation Trust
Countess of Chester Hospital
Liverpool Road
Chester
England
CH2 1UL

Study participating centre
Buckinghamshire Healthcare NHS Trust
Stoke Mandeville Hospital
Mandeville Road
Aylesbury
England
HP21 8AL

Study participating centre
Northumbria Healthcare NHS Foundation Trust
North Tyneside General Hospital
Rake Lane
North Shields
England
NE29 8NH

Study participating centre
University Hospitals Plymouth NHS Trust
Derriford Hospital
Plymouth
England
PL6 8DH

Study participating centre
Northern Devon Healthcare NHS Trust
North Devon District Hospital
Raleigh Park

Barnstaple
England
EX31 4JB

Study participating centre
Guy's and St Thomas' NHS Foundation Trust
St Thomas' Hospital
Westminster Bridge Road
London
England
SE1 7EH

Study participating centre
Sherwood Forest Hospitals NHS Foundation Trust
Kings Mill Hospital
Mansfield Road
Sutton In Ashfield
England
NG17 4JL

Study participating centre
Great Western Hospitals NHS Foundation Trust
Great Western Hospital
Marlborough Road
Swindon
England
SN3 6BB

Study participating centre
Sheffield Teaching Hospital NHS Foundation Trust
Northern General Hospital
Sheffield
England
S5 7AU

Study participating centre
Basildon and Thurrock University Hospitals NHS Foundation Trust
Basildon University Hospital
Nethermayne

Basildon
England
SS16 5NL

Study participating centre
University Hospital of Derby and Burton NHS Foundation Trust
Queen's Hospital
Belvedere Road
Burton-on-Trent
England
DE13 0RB

Study participating centre
Gloucestershire Hospitals NHS Foundation Trust
Gloucester Royal Hospital
Great Western Road
Gloucester
England
GL1 3NN

Study participating centre
Bradford Teaching Hospitals NHS Foundation Trust
Bradford Royal Infirmary
Duckworth Lane
Bradford
England
BD9 6RJ

Study participating centre
County Durham and Darlington NHS Foundation Trust
University Hospital of North Durham
North Road
Durham
England
DH1 5TW

Study participating centre
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
Royal Bournemouth Hospital
Castle Lane East
Bournemouth

England
BH7 7DW

Study participating centre
Royal Free NHS Trust
Pond St
London
England
NW3 2QG

Study participating centre
Royal Devon and Exeter Foundation Trust Hospital
Barrack Road
Exeter
England
EX2 5DW

Study participating centre
Hereford County Hospital
Stonebow Road
Hereford
England
HR1 2ER

Study participating centre
Royal Bolton Hospital
Minerva Road
Bolton
England
BL4 0JR

Study participating centre
Royal Blackburn Hospital
Haslingden Road
Blackburn
England
BB2 3HH

Study participating centre

Tameside General Hospital
Fountain Street
Ashton Under Lyne
England
OL6 9RW

Study participating centre
The Whittington Hospital
Magdala Avenue
London
England
N19 5NF

Study participating centre
Royal Derby Hospital
Uttoxeter Rd
Derby
England
DE22 3NE

Study participating centre
Musgrove Park Hospital
Musgrove Park
Taunton
England
TA1 5DA

Study participating centre
Worthing Hospital
Lyndhurst Road
Worthing
England
BN11 2DH

Study participating centre
Royal Albert and Edward Infirmary
Wigan Lane
Wigan
England
WN1 2NN

Study participating centre
Weston General Hospital
Grange Road
Uphill
Weston-Super-Mare
England
BS22 4TQ

Study participating centre
Royal Lancaster Infirmary
Ashton Road
Lancaster
England
LA1 4RP

Study participating centre
St Mary's Hospital
Parkhurst Road
Newport
England
PO30 5TG

Study participating centre
University Hospitals Coventry and Warwickshire
Clifford Bridge Road
Coventry
England
CV2 2DX

Study participating centre
Forth Valley Royal Hospital
Stirling Road
Larbert
Scotland
FK5 4WR

Study participating centre
University Hospital of North Tees
Hardwick Road

Stockton-on-tees
England
TS19 8PE

Study participating centre
Southend University Hospital NHS Foundation Trust
-
Westcliff on Sea
England
SS0 0RY

Study participating centre
Sunderland Royal Hospital
Kayll Road
Sunderland
England
SR4 7TP

Study participating centre
Royal United Hospitals Bath NHS Foundation Trust
Combe Park
Bath
England
BA1 3NG

Study participating centre
Aneurin Bevan University Health Board
Royal Gwent Hospital
Cardiff Road
Newport
Wales
NP20 2UB

Study participating centre
St George's Hospital NHS Foundation Trust
Ground Floor
Jenner Wing
Cranmer Terrace
London
England
SW17 0RE

Study participating centre
Milton Keynes University Hospital
Standing Way
Eaglestone
Milton Keynes
England
MK6 5LD

Study participating centre
University Hospitals Birmingham NHS Foundation Trust
-
Birmingham
England
B15 2TH

Study participating centre
University Hospital Southampton NHS Foundation Trust
Southampton General Hospital
Southampton
England
SO16 6YD

Study participating centre
Doncaster Royal Infirmary
Armthorpe Road
Doncaster
England
DN2 5LT

Study participating centre
Freeman Road Hospital
Freeman Road
High Heaton
Newcastle upon Tyne
England
NE7 7DN

Study participating centre

Northampton General Hospital
Cliftonville
Northampton
England
NN5 1BD

Study participating centre
Belfast Health and Social Care Trust
Trust Headquarters, A Floor
Belfast City Hospital
51 Lisburn Road
Belfast
Northern Ireland
BT9 7AB

Study participating centre
York and Scarborough Teaching Hospitals NHS Foundation Trust
Wiggington Road
York
England
YO31 8HE

Study participating centre
Queen Elizabeth Hospital Gateshead
Queen Elizabeth Avenue
Gateshead
England
NE9 6SX

Study participating centre
Princess of Wales Hospital
Coity Road
Bridgend
Bridgend County Borough
Wales
CF31 1RQ

Study participating centre
Hull University Teaching Hospitals NHS Trust
Castle Hill Hospital
Castle Road

Cottingham
England
HU16 5JQ

Study participating centre
Ipswich Hospital
Heath Road
Ipswich
England
IP4 5PD

Study participating centre
Shrewsbury & Telford Hospital NHS Trust
Mytton Oak Road
Shrewsbury
England
SY3 8XQ

Study participating centre
St Mary's Hospital
St. Marys Hospital
Parkhurst Road
Newport
England
PO30 5TG

Sponsor information

Organisation
Leeds Teaching Hospitals NHS Trust

ROR
https://ror.org/00v4dac24

Funder(s)

Funder type
Not defined

Funder Name
Health Technology Assessment Programme

Alternative Name(s)
NIHR Health Technology Assessment Programme, Health Technology Assessment (HTA), HTA

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
Data requests would be sent to the study manager via sunflower-study@bristol.ac.uk. The full de-identified dataset would be available and will be held indefinitely. Access would be dependent on provision of an ethically approval study protocol and could cover numerous analysis types. The mechanism of data sharing would be determined at the time. Consent from participants will be obtained for data sharing. Data will be de-identified. Ethical approval for a new project would need to be in place.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol article		29/06/2021	13/08/2021	Yes	No
HRA research summary			28/06/2023	No	No
Participant information sheet	version 7.0	11/07/2022	29/07/2022	No	Yes
Protocol file	version v4.0	18/08/2020	23/09/2020	No	No
Protocol file	version 5.0	08/09/2021	27/10/2021	No	No
Protocol file	version 7.0	07/09/2023	17/10/2023	No	No
Protocol file	13/12/2024: The sunflower-study contact stated that based on funder recommendations protocol v8.0 had been withdrawn and the withdrawal has been confirmed by the HRA/REC, which fully withdrew the amendment to introduce version 8.0. Protocol v7.0, dated 07/09/2023 is in use. version 8.0	10/10/2024	20/11/2024	No	No

Protocol file	version 9.0	16/12/2025	08/01/2026	No	No
Study website		11/11/2025	11/11/2025	No	Yes