Enhanced Recovery Programme for Primary Total Hip and Total Knee Replacement

NHS
Whipps Cross
University
Hospital
Barts Heath

Table of Contents

1. Summary

The *Enhanced Recovery Program* will be introduced for all patients having primary hip or knee arthroplasty at Whipps Cross Hospital. This will comprise engagement with Joint School, pre-emptive analgesia, modifications to anaesthetic technique to promote regional anaesthesia where possible, short surgical duration, early involvement of physiotherapy and early discharge.

2. Introduction

Enhanced Recovery Programs for joint replacements are associated with quicker recovery times, better pain scores, and earlier discharge. This provides a better patient experience and also reduces bed occupancy. In 2016/17, Whipps median length of stay for primary hip replacement was 5.67 days, and for knee replacement it was slightly longer, showing significant scope for improvement.

Surgical and anaesthetic technique currently vary widely.

The ERP will consist of a bundle of interventions from the multi-disciplinary team, all designed to facilitate early mobilisation and early discharge. The pathway includes some additional components:

- Haemoglobin optimisation by Pre-assessment team – Target Hb 130gl.
- Pre surgery education of patients in "Joint School" to relieve anxiety related to anaesthesia and analgesia and increase patient understanding/motivating.
- Standardised approach to anaesthesia and pain relief peri-operatively to facilitate physiotherapy and mobilisation.
- Encourage mobilisation on the day of surgery (Day 0).
- Structured approach to postoperative physiotherapy exercises to allow early independent mobilisation using crutches.
- Standardised Checklist based discharge criteria.
- Follow up of patients after discharge from hospital – 48 hours post discharge phone call to patients to provide support, information and allow early identification of postoperative problems. (this will form part of the initial audit period).

3. Definitions

- THR = Total Hip Replacement
- TKR = Total Knee Replacement
- HVLIA = High Volume Local Infiltrative Analgesia
- APS = Acute Pain Service
- ACB = Adductor Canal Block
- FIB = Fascia Iliaca Block

4. Scope

All patients undergoing primary hip or knee arthroplasty are to be enrolled in this ERP unless stated in the Post op Note. Complex revision surgery and patients with severe co-morbidities may not be suitable for enhanced recovery, however the principles and components of this document should still be used in order to enhance their care. Staff groups involved will include orthopaedic surgeons, anaesthetists, nursing staff on Sage & Sycamore, physiotherapists, pharmacists and staff participating in 'Joint School'.

Collective Goals of Orthopaedic Clinic, Anaesthetic Pre-assessment and Joint School:

- **Patient counselling – adjusting expectations re length of stay, early mobilisation etc.**
- **Encourage pre-conditioning/weight loss where appropriate**
- **Optimisation of concurrent medical condition/s and haemoglobin**
- **Patient information leaflet and video (to be available online)**
- **Appropriate patient selection for ERP**

Note - Patients on regular opioids, or opioid dependence programs, can still take part in the ERP. They should however be discussed with the APS and an individualised analgesic regimen planned.

5. Perioperative Protocol (Both THR & TKR)

At Home:

NBM for only six hours: drink water until 06.00am (10.00am for pm list)
Carbohydrate Drink 2-3h before surgery (6am morning, 11am afternoon)

On the Ward:

Pre-emptive Analgesia

(If administered patient must come down to theatre on a chair)

- **Paracetamol 1g PO**
- **Gabapentin PO:**

- 300mg (<70 yo and eGFR >30)

- 100mg (>70 yo or eGFR <30)

If already taking gabapentin/pregabalin, or other chronic pain adjunct, eg carbamazepine, SSRI, SNRI - continue this and omit perioperative gabapentin

Omit if any allergy/intolerance

- **Oxycontin PO:**

  - 10mg (<70 yo and eGFR > 30)

  - 5mg (>70 yo, or eGFR <30)

6. Primary TKR Intraoperative Guidelines

Suggested Anaesthetic Technique

1. Spinal Anaesthesia without opioid + ACB (30ml 0.25% L-Bupivacaine) + HVLIA as per protocol

2. If unfamiliar with/still learning ACB

- Spinal anaesthesia with Diamorphine 150mcg + HVLIA as per protocol +/- ACB
- While unfamiliar with ACB please liaise with Anaesthetic coordinator who may be able to source assistance.

3. If Surgeon will not perform HVLIA as per protocol (ie not infiltrating posterior capsule)

- Spinal anaesthesia with Diamorphine 150mcg + ACB + wound infiltration per surgeon.
- Total local anaesthetic dosing will still have to be adhered to as in the HVLIA protocol.

4. If unfamiliar with/still learning ACB + surgeon will not perform HVLIA per Protocol (ie not infiltrating posterior capsule)

- Spinal anaesthesia with Diamorphine 150mcg, +/- ACB + wound infiltration per surgeon.
- While unfamiliar with ACB please liaise with Anaesthetic coordinator who may be able to source assistance.
- Total local anaesthetic dosing will still have to be adhered to as in the HVLIA protocol.

5. General Anaesthesia + ACB + HVLIA as per protocol

- General Anaesthesia should be employed in the event of failed Spinal Anaesthesia placement, clinical contraindication for neuraxial technique, or patient refusal.
- If unfamiliar with ACB please liaise with Anaesthetic coordinator who may be able to source assistance.

6.1. Primary TKR Intraoperative Guidelines

- **Antibiotics:**

As per trust guidelines

- **Intra-Op Sedation/Analgesia:**

TCI Propofol titrated per patient comfort (spinal anaesthesia)
Titrate IV opioid as clinically appropriate (general anaesthetic)

- **Antiemetics:**

Ondansetron 4mg
IV Dexamethasone 6.6mg IV (as soon as spinal anaesthesia established or following general anaesthesia induction - (caution in diabetes)

- **Anti-fibrinolytic:**

Tranexamic Acid 1g ***TKR 10 mins prior to tourniquet release***

- **Temperature:**

Maintain normothermia for all patients in the peri-operative period. Forced air warming and warmed/pre-warmed fluid for all patients

- **IV Fluids:**

Aim ***<1L*** crystalloid , if both surgery and anaesthesia uncomplicated. Adjust fluid requirements per patient condition

- **Other:**

Limit surgical time, senior operator leading surgery, avoid urinary catheterisation

7. Primary THR Intraoperative Guidelines

Suggested Anaesthetic Technique

1. Spinal Anaesthesia with/without opioid + HVLIA as per protocol

- Spinal anaesthesia with Diamorphine 150 mcg (if using opioid) + HVLIA as per protocol.

2. General Anaesthesia + FIB (40 mls 0.125% L-Bupivacaine) - Ideally Suprainguinal approach for optimal analgesia) + HVLIA as per protocol

- Employ in the event of failed Spinal Anaesthesia placement, clinical contraindication for neuraxial technique, or patient refusal.
- If unfamiliar with FIB please liaise with Anaesthetic coordinator who may be able to source assistance.

7.1. Primary THR Intraoperative Guidelines

- **Antibiotics:**

As per trust guidelines

- **Intra-Op Sedation/Analgesia:**

TCI Propofol titrated per patient comfort (spinal anaesthesia)
Titrate IV opioid as clinically appropriate (general anaesthetic)

- **Antiemetics:**

Ondansetron 4mg
IV Dexamethasone 6.6mg IV (as soon as spinal anaesthesia established or following general anaesthesia induction (caution in diabetes)

- **Anti-fibrinolytic:**

Tranexamic Acid 1g ***prior to incision***

- **Temperature:**

Maintain normothermia for all patients in the peri-operative period. Forced air warming and warmed/pre-warmed fluid for all patients

- **IV Fluids:**

Aim **<1.5L** crystalloid if both surgery and anaesthesia uncomplicated. Adjust fluid requirements per patient condition

- **Other:**

Limit surgical time, senior operator leading surgery, avoid urinary catheterisation

8. Postoperative Analgesia

Regular Pain Relief

- Paracetamol - 1g QDS PO Dose ↓to 500mg QDS PO if patient weight <50Kg
- Ibuprofen - 400mg TDS PO (3 day prescription if no contraindications - Do not give if eGFR <40, avoid in patients taking ACE-I or ARB. Caution in patients taking digoxin or diuretics.) / ***Omeprazole 20mg OD PO (While on NSAID)***
- Gabapentin - <70yo and eGFR >30 - 300mg BD PO, >70yo or eGFR < 30 – 100mg TDS, eGFR <15 – 100mg BD. First post op dose at 10pm. Decrease dose (seek pain team advice) if nursing staff or physio concerned that drowsiness is impairing mobility
- Oxycontin (MR) - < 75yo and eGFR >30 - 10mg BD PO (Day 0, 1, 2), >75yo or eGFR <30 – 5mg BD (Day 0, 1, 2) – First post op dose at 6pm (am list), 10pm (pm list). Subsequent doses at 8am/8pm
- Oxynorm (IR) – Instead of Oxycontin if eGFR <15 – 2.5mg QDS PO (Day 0, 1, 2)
- Dihydrocodeine – 30mg QDS PO (From Day 3 when Oxycontin is stepped down)

As Required Pain relief

- Oxynorm IR - 10mg PRN 4hrly PO. 5mg 4hrly if age >75 or eGFR <30 (Day 0, 1, 2)
- Dihydrocodeine - 30mg QDS PO from Day 3 (as well as regular, to maximum total dose of 240mg/24h).

Inadequate Analgesia

Oxycontin MR and Oxynorm **IR** can be increased in 5-10mg increments following discussion with the APS (in hours) / On call anaesthetist (Out of hours)

Catheter Based Pain relief (optional)

- Intra-articular Catheter if placed (TKR) – Bolus 40ml 0.2% Ropivacaine – Dose 1 (6h post op), Dose 2 (8-11pm – minimum 4h post dose 1), Dose 3 (6am Day 1). After Dose 3 catheter can be removed

or

- Adductor Canal catheter if placed (TKR) – Follow Trust Guidance document. Suggested Regime: 5-10ml/h 0.125% L Bupivacaine (elastomeric pump) plus PRN Rescue bolus of 20ml 0.25% L Bupivacaine 12 hourly. Catheter must be removed by the beginning of Day 2

9. Other Postoperative Medication

- **Regular:** Ondansetron 4mg TDS IV/PO, Senna 30mg ON, Movicol 1 sachet BD, LMWH prophylaxis as per Trust guidelines, Post op Antibiotics as per trust guidelines
- **Regular:** Ferrous Fumarate 210mg TDS PO (if trigger met, *see section 10*)
- **As required:** Anti Emetics - Ondansetron to max 4mg TDS PO/IV *(in addition to regular)*, Cyclizine 50mg TDS PO/IV
- **As Required:** Naloxone (40microgram IV bolus up to max 400microgram if RR <8)
- **As Required:** Chlorphenamine 4mg PO or if unable to swallow 10mg IV/SC/IM.

10. Recovery Care

- Full body warming blanket to be used in recovery if temp <36 (Target >36.5)
- O2 via face mask if SaO2 <95%
- Haemacue

- Blood Transfusion ERP triggers for recovery:
  - **Hb drop 40g/l or more from pre-op or**
  - **Hb < 80g/l or**
  - **Symptomatic of anaemia (eg haemodynamic instability, breathless, chest pain, postural dizziness)**
  - **If patient condition is stable and autologous drain re-infusion has been prescribed please utilise in first instance and recheck Haemacue**
  - **Follow trust guidance for blood/blood product transfusion and observe the single unit transfusion policy recommended by haematolog**

If a higher/alternate transfusion trigger is required on case by case analysis then a discussion between Senior Anaesthetist and Senior Orthopaedic Surgeon is needed, and should be indicated on the post op instructions.

- Prescribe Iron in recovery (to be administered on ward) if patient stable and

  Hb drop >20gl from pre op OR Hb <110 gl

  Prescription: Oral Iron (Ferrous Fumarate 210mg TDS)
- Aim IV fluids to complete and giving set to come down before leaving recovery if patient stable (if in doubt liaise with anaesthetic team)
- Apply Cryocuff (TKR if available)
- With an opioid free spinal technique it is possible that motor function and sensation may begin to return in recovery, if the patient experiences discomfort, administer oral Oxynorm IR 5-10mg and review

11. Postoperative Care

- Encourage eating and drinking.
- Orthopaedic team to send FBC on ward at 4h post recovery discharge (mark as urgent and review result) if:

  - Patient received blood in recovery
  - Recovery Haemacue between 80 – 110 g/dl
  - Recovery Haemacue shows Hb Drop of 20g/l or more from pre-op
  - Any signs of haemodynamic instability while on ward (may require to be sent earlier)
- Maintain Hb >80g/l unless symptomatic anaemia or alternative target set by orthopaedic/anaesthetic team.
- Follow trust guidance for blood/blood product transfusion and observe the single unit transfusion policy recommended by haematology
- Prescribe Iron if patient stable and **Hb drop >20gl from pre op OR Hb <110 gl**

  - Prescription: Oral Iron (Ferrous Fumarate 210mg TDS)
- Routine blood tests (full blood count / U&Es should be checked at 24h & 48h post op).
- Early mobilisation – seen by physio on day of surgery (=day 0) and mobilised as soon as spinal wears off. Follow physio ERP protocol till discharge ready
- Nursing staff to refer to APS on day 1 if pain is preventing mobilisation, or if concerns regarding drowsiness.
- Avoid epidural, PCA, IV fluids, urinary catheter where possible to encourage/ facilitate mobilisation.
- Remove intra-articular catheter morning of Day 1 (if applicable).
- Remove Adductor Canal catheter by morning of Day 2 (if applicable).
- Stop regular strong opioids by end of Day 2.
- Stop regular anti-emetics and laxatives when strong opioids have been stepped down to dihydrocodeine.
- Anaemia management discharge plan if applicable.
- *Aim Home day 3.*

12. IMPLEMENTATION

Date for implementation of guideline by ERP Team: Stepwise from April 2018.

13. MONITORING / AUDIT

Ongoing continuous audit of Length-of-stay figures, recovery pain scores, nausea scores, time in recovery and patient satisfaction. Figures will be collected and analysed 6 months and 1 year months after full implementation of ERP.

14. FREQUENCY OF REVIEW

Prescription Careset to be reviewed every 2 years. Full guideline to be reviewed every 3 years. Either can be done sooner should there be further advances in the field of practice

15. PERSONS RESPONSIBLE FOR REVIEW

Dr Suyogi Jigajinni (Consultant Anaesthetist), Mr Kesavan Sri-Ram (Consultant Orthopaedic Surgeon)

16. NAME OF DIVISIONAL GROUP

Lower Limb ERP taskforce

17. STAKEHOLDERS

- Dr Suyogi Jigajinni (Consultant Anaesthetist, representing the Anaesthetic Department)
- Mr Kesavan Sri-Ram (Consultant Orthopaedic Surgeon, representing Orthopaedic Department)
- Dr Jessie Hoyle (Consultant Anaesthetist, Acute Pain Service Lead)
- Mr Vishwanath Joshi (Lead Physiotherapist)
- Matron/Charge Nurse Sage Ward,
- Nilofer Patel (Lead Pharmacist)

18. CONSULTATION

ERP Documents & ERP Leads – St Mary's Hospital London, Royal Infirmary Edinburgh, Golden Jubilee National Hospital, Glasgow, RJAH Orthopaedic Hospital, Ostwestry, Norfolk & Norwich University Hospitals NHS Foundation Trust, Nottingham University Hospitals NHS Trust, University College London Hospital, Leighton Hospital.

19. AUTHOR / FURTHER INFORMATION

Dr Suyogi Jigajinni, Consultant Anaesthetist, Whipps Cross University Hospital, Trust email address: suyogi.jigajinni@bartshealth.nhs.uk

20. NEXT REVIEW

February 2021

21. THIS GUIDELINE REPLACES

The 2014 Guideline and is to be read and applied concurrently with the updated protocol for HVLIA Administration

22. EQUALITY IMPACT OF GUIDELINE

Is this guideline anticipated to have any significant equality-related impact on patients, carers or staff? No

23. REFERENCES

1. O'Donnell, R. et al. Anaesthesia and analgesia for knee joint arthroplasty, BJA Education , Volume 18 , Issue 1 , 8 – 15, Jan 2018.

2. G. Burns et al. Does a reduction in intrathecal opioid dose improve early mobilisation? Anaesthesia 2017, 72, (Suppl. 2), 10–92

3. Zhou M, Ding H, Ke J. Adductor canal block in combination with posterior capsular infiltration on the pain control after TKA. Ir J Med Sci. 2017 Jul 7. doi: 10.1007/s11845-017-1647-3.

4. M. Muñoz A. G. Acheson M. Auerbach et al International consensus statement on the peri-operative management of anaemia and iron deficiency. Anaesthesia 2017, 72, 233–247

5. Xing Q, Dai W, Zhao D, Wu J, Huang C, Zhao Y. Adductor canal block with local infiltrative analgesia compared with local infiltrate analgesia for pain control after total knee arthroplasty: A meta-analysis of randomized controlled trials. Amornyotin. S, ed. Medicine. 2017;96(38):e8103.

6. Mao T1, Gao F, Han J et al. Restrictive versus liberal transfusion strategies for red blood cell transfusion after hip or knee surgery: A systematic review and meta-analysis. Medicine (Baltimore). 2017 Jun; 96(25):e7326.

7. Red blood cell transfusion: 2016 clinical practice guidelines from AABB. Accessed March 2018

8. AAGBI: use of blood components and alternatives 2016. Accessed March 2018

9. Sawhney, Monakshi, Pain After Unilateral Total Knee Arthroplasty: A Prospective Randomized Controlled Trial Examining the Analgesic Effectiveness of a Combined Adductor Canal Peripheral Nerve Block with Periarticular Infiltration Versus Adductor Canal Nerve Block Alone Versus Periarticular Infiltration Alone. Anesthesia & Analgesia. 122(6):2040-2046, June 2016.

10. Soffin & Yadeau. Enhanced recovery after surgery for primary hip and knee arthroplasty: a review of the evidence. British Journal of Anaesthesia, 117 (S3): iii62–iii72 (2016)

11. Tucker A, McCusker D, Gupta N, Bunn J, Murnaghan M. Orthopaedic Enhanced Recovery Programme for Elective Hip and Knee Arthroplasty – Could a Regional Programme be Beneficial? The Ulster Medical Journal. 2016;85(2):86-91.

12. Han C, Li X, Jiang H, Ma J, Ma X. The use of gabapentin in the management of postoperative pain after total hip arthroplasty: a meta-analysis of randomised controlled trials. Journal of Orthopaedic Surgery and Research. 2016;11:79. doi:10.1186/s13018-016-0412-z.

13. Zhai L, Song Z, Liu K. The Effect of Gabapentin on Acute Postoperative Pain in Patients Undergoing Total Knee Arthroplasty: A Meta-Analysis. Barkin. R, ed. Medicine. 2016;95(20):e3673.

14. Transfusion Blood transfusion, NICE guideline NG24, Methods, evidence and recommendations November 2015. Accessed March 2018

15. David M, Arthur E, Dhuck R, Hemmings E, Dunlop D. High rates of postoperative urinary retention following primary total hip replacement performed under combined general and spinal anaesthesia with intrathecal opiate. Journal of Orthopaedics. 2015;12(Suppl 2):S157-S160. doi:10.1016/j.jor.2015.10.020.

16. K Place, NB Scott; Enhanced recovery for lower limb arthroplasty, Continuing Education in Anaesthesia Critical Care & Pain, Volume 14, Issue 3, 1 June 2014, Pages 95–99

17. AFFAS, F., EKSBORG, S., WRETENBERG, P., OLOFSSON, C., STEPHANSON, N. and STILLER, C.-O. (2014), Plasma concentration of ketorolac after local infiltration analgesia in hip arthroplasty. Acta Anaesthesiol Scand, 58: 1140–1145. doi:10.1111/aas.12371

18. Carson JL, Terrin ML, Noveck H et al. Liberal or restrictive transfusion in high-risk patients after hip surgery. N Engl J Med. 2011 Dec 29; 365(26):2453-62.