GYNAECOLOGY POST-OPERATIVE EPIDURAL INFUSION GUIDELINE

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The only Valid Version is stored in the Policies, Procedures and Guidelines Intranet Site

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Grade of Change	Minor Revision
Summary of Changes	Formatting

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Designation of Guideline Sponsor	Director of Nursing Services
Responsible Committee	Anaesthetic Clinical Meeting

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Contents

1 Introduction

The Anaesthetic department has compiled this guideline as a practical aid to staff in order to manage gynaecology patients with a temporary in-dwelling epidural catheter.

Consequently the guideline is designed to promote and facilitate a multi-disciplinary approach to the assessment, and management of these patients.

2 Definitions

2.1 Epidural Space

The epidural space is situated between the dura mater (the outer layer of the meninges) and the vertebral canal. It extends from the cranium to the sacrum and contains loose connective tissue, fat, lymph vessels, blood vessels and nerves.

2.2 Temporary Indwelling Epidural Catheter

A temporary indwelling epidural catheter is a fine plastic tube which is situated in the epidural space. Analgesia is continually infused into the epidural space via the catheter in order to block the nerve messages and achieve satisfactory pain control for the patient postoperatively.

3 Equipment Used

The equipment used for the post-operative administration of gynaecology epidural analgesia within the Liverpool Women's NHS Foundation Trust is:-

Smiths medical CADD Solis yellow infusion device

Smiths medical CADD Solis epidural administration sets Epidural

catheter with an in-line filter

Yellow 'FOR EPIDURAL USE ONLY' sticker

Epifix

Clear adhesive film dressing (eg Tegaderm) outlined with tape (eg Mepore) over epidural catheter site, with tape securing the epidural catheter up the patient's back.
Designated epidural infusion devices are only to be used for epidural infusions. Staff must be competent in using the Smiths medical CADD Solis infusion device.
Recovery and the ward must ensure that there is a stock of the disposable epidural equipment.

Theatre and High dependency are to ensure the epidural bags are appropriately stored.
Replacement epidural bags must be checked, signed for, and if appropriate, made, by two trained staff.
Aseptic technique must be used when removing and replacing the epidural bags. Do not wipe connectors with alcohol or antimicrobial solution (these are toxic in the epidural space.)

4 Epidural Prescription

The standard prescription for the epidural infusion will be

250mls 0.1% Levobupivacaine with 500 mcg Fentanyl (2 mcg / ml solution)

Nursing staff must check the electronic prescription tallies with both the infusion bag and the programming on the pump. If there are any discrepancies then contact the anaesthetist.

Nursing staff must document that the pump settings and the electronic prescription tally.

5 Commencement Of Epidural Infusion

Please note epidural catheters should not be inserted into patients who are already fully anticoagulated (SEE APPENDIX H)

The anaesthetist will gain informed consent from the patient prior to insertion of the epidural catheter.

The anaesthetist will inform the recovery staff and the ward staff of the patient's requirement for a post-operative epidural infusion

A Smiths medical CADD Solis yellow infusion device will be allocated to the anaesthetist, and a record made by the anaesthetist of the pump number and the patient in the epidural record folder in recovery.

The procedure for commencing an epidural infusion must be followed (see appendix C):-

The inserted epidural catheter must be secured in place and the epidural filter secured to the patients shoulder. The yellow infusion line can be attached to the filter and when required, the infusion commenced.

The anaesthetist must ensure the epidural is entered on the patient's electronic prescription. All patients with an epidural infusion must have an IV infusion for the duration of the epidural.

6 Epidural Infusion Parameters

The standard gynaecology post-operative epidural infusion programme parameters are:-

Rate - 1 – 15 mls / hour

The rate is determined by the patients' pain levels and their physiological stability and can be altered only by competent trained staff.

Bolus Dose - 10 mls

The bolus dose is determined by the patients' pain levels and their physiological stability.

Lockout Time - 20 minutes

The correct time for assessing effectiveness of a bolus is 20 minutes after administration.

Infusion Bag - 250 mls

250 mls bags of Levo-bupivacaine with 2mcg/ml Fentanyl are used as standard

Air Alarm - 2 mls

The air alarm detection volume for the Smiths medical CADD Solis epidural pumps is automatically set as 'on'.

The gynaecology post-operative epidural infusion standard protocol is:-

Rate	-	10 mls/hr
Bolus Dose	-	10 mls
Lockout Time	-	20 mins
Infusion Bag	-	250mls
Air Alarm	-	2mls (automatically 'on')

7 Smiths medical CADD Solis Infusion Pump Clinician Guide

All clinicians will have received training prior to using the pumps

8 Recovery

The epidural infusion must run for a minimum of one hour in recovery before the patient returns to the ward

The patient must be stable and comfortable before discharge to the ward.

9 Observations

All routine post-operative observations are to be recorded.
The Gynaecology Epidural Assessment Record is to be completed. The record, shown in Appendix E, includes:-

Date & Time
Date and time of the observation documentation

Infusion Rate (mls/hr)
Current rate of the epidural infusion device

Volume Remaining
Volume remaining in current infusion bag

Epidural Site

Record of visual assessment of epidural site.
Staff must be fully compliant with the infection control guideline
Dermatome Level (Right & Left)
Right and left sided dermatome levels
Aim to be between L2 and T6
Leg Movement (Right & Left)
The Bromage scale (Appendix F) must be used to document the ability of the patient to bend own knees, and move feet on right and left sides

Bolus Amount Given
Record of amount of bolus provided

Signature
Signature of person recording the observations

2nd Signature
Signature from 2nd trained staff if bolus given

The frequency of observations is as follows Every

15 minutes - For first hour

1/2 Hourly - For next 2 hours

Hourly - For the next 4 hours

4 Hourly - If the patient is stable until epidural catheter withdrawn If the patient becomes unstable then the frequency of observations must increase appropriately until the patient is deemed stable once more.

10 Bolus Delivery

In the event of a patient complaining of inadequate pain relief and requiring a bolus then a bolus dose of 10 mls may be given.

If the bolus dose needs changing then this must only be completed by two competent trained staff.

The anaesthetist and one trained staff nurse must document and provide signatures for the amount of bolus administered on the epidural assessment record. There is space on the epidural assessment record for documenting the required observations after a bolus has been administered, see appendix E.

If a bolus is required the following observations must be recorded:-

Time 0 (prior to bolus), 5, 10, 15, and 20 minutes	Blood Pressure Heart Rate Respiratory Rate Dermatome Level (Right & Left)
Movement (Right & Left)	Leg Sedation Score Pain Score

If the patient continues to complain of inadequate pain management after the bolus then the anaesthetist must be contacted for advice.
If the patient is comfortable and stable after the 20 minutes then return to pre-bolus observation frequencies.

11 Concomitant Medication

Patients must receive NSAIDS if appropriate

Patients must receive Paracetamol as prescribed.

Patients with epidural infusions should receive NO OTHER opioid or local anaesthetic medication for the duration of the infusion except after consultation with the anaesthetist

Caution must be practiced if any sedating medication is administered during the time of the epidural infusion.

12 Complications & Actions

Note – If a complication occurs then please ensure an ACE form is completed

12.1 Common Complications

12.1.1 Urinary Retention

The epidural affects the nerves which supply the bladder so a urinary catheter is always inserted to drain the urine away. This urinary catheter must remain in place until after the infusion has been discontinued and the effects of the epidural have worn off.

12.1.2 Hypotension / Bradycardia

Low blood pressure is common after surgery, even without an epidural. The local anaesthetic causes vasodilation, so blood pressure will drop a little.

ACTIONS
Switch the infusion off
Inform the anaesthetist immediately. Call
2222 if required

If the patient experiences postural hypotension then mobilise them carefully and slowly.

12.1.3 Pruritis

This can occur as a side effect of the opioids.

ACTIONS
Administer prescribed antihistamine

Contact anaesthetist for advice if required
Consider using naloxone.

12.1.4 Nausea / Vomiting

Post-operative nausea and vomiting (PONV) is multifactorial

ACTIONS
Use current PONV protocol
Contact anaesthetist for advice if required

12.1.5 Pain / Discomfort

The epidural may not be working adequately

ACTIONS
Ensure the patient has been given all other appropriate analgesia.
Lie patient on painful side if possible
Increase infusion rate if appropriate
Provide bolus if required (see detail above regarding boluses)
Contact anaesthetist for advice if required

12.1.6 Headache / Dural Tap

Headache is a common symptom and multifactorial. Postural reasons for headache should be eliminated before contacting the anaesthetist

ACTIONS
Headache could be a sign of a possible dural tap, if a dural tap is suspected then:
Lay the patient flat
Inform the anaesthetist

12.1.7 Backache

This is common after surgery, with or without an epidural and is often caused by lying on a firm flat operating table.

12.1.8 Loss Of Feeling / Movement In Legs

Loss of feeling or movement in legs may be the result of the infusion running at too high a rate for the patient and a motor block together with the sensory block is present.

ACTIONS
Reduce or stop the epidural infusion
Lay the patient on to the non-effected side if applicable
Inform the anaesthetist
Ensure patient safety when mobilising

12.1.9 Leaking Epidural Site

Contact the anaesthetist to assess.

12.2 Uncommon Complications

12.2.1 Respiratory Depression (Respiratory rate of 8 bpm or below)

The epidural medications can cause respiratory depression, if this occurs:-

ACTIONS
Switch off the epidural infusion
Call 2222
Provide 40% oxygen via a rebreathing mask
Consider using naloxone
Inform the anaesthetist

12.2.2 Infection

The epidural catheter site may show signs of infection (redness, tender, swelling, or pus) if this happens:-

ACTIONS
Check temperature, pulse, blood pressure, and respiratory rate Swab
the catheter site (patient will require antibiotics).
Discontinue the epidural infusion
Remove the epidural catheter remembering to send 5cm of the blue tip for culture & sensitivity.
Inform the anaesthetist
Inform the infection control nurse

12.2.3 Pressure Sores

Treat as per nursing protocol

12.2.4 Over Sedation

The patient may become unrousable due to the epidural opioid

ACTIONS
Patient is unrousable)
Switch off the epidural infusion
Call 2222

Provide 40% oxygen
Inform the anaesthetist
Consider naloxone 400mcg iv stat

12.3 Rare Complications

12.3.1 Subarachnoid Injection

The patient may complain of difficulty breathing, tingling sensations or feeling faint.
ACTIONS
Stop the epidural infusion
Inform the anaesthetist immediately
Call 2222 if required

12.3.2 Epidural Haematoma / Abscess
Urgently contact the anaesthetist to assess.

13 Discontinuation Of Epidural

13.1 The epidural catheter will be removed when:-

13.1.1. Epidural is no longer required for analgesia (this is normally when the patient is able to tolerate either PCA or oral analgesia and pain management is satisfactory).

13.1.2 When analgesia is inadequate despite input from anaesthetist

13.1.3 If the epidural catheter has been insitu for more than 3 days (unless tunnelled, or instructed differently by anaesthetic staff) as it now becomes a potential source of infection.

13.2 Please note anticoagulation therapy may be interrupted to allow the epidural catheter to be removed (SEE APPENDIX H)

13.2.2 Low Molecular Weight Heparin (LMWH)(Usually “Fragmin” in *this Trust)*

13.2.2.1 Epidural Insertion

If the epidural is to be inserted into a patient already on LMWH then for:
Prophylactic dose of LMWH: **TWELVE HOURS** must have elapsed between the last dose of
LMWH and the epidural catheter being inserted.
Treatment dose of LMWH: **TWENTY FOUR HOURS** must have elapsed between the last dose of LMWH and the epidural catheter being inserted

13.2.2.2 Epidural Removal
When the epidural catheter is removed then **TWELVE HOURS** must have elapsed between the last dose of LMWH (prophylactic dose) and the epidural catheter being removed. It is not recommended to administer a treatment dose of LMWH while an epidural catheter is in place.

13.2.2.3 Post Epidural Fragmin Doses
When the epidural catheter has been sited or removed then at least **FOUR HOURS** must elapse before the next dose of LMWH is administered.

13.2.3 Unfractionated Heparin Intravenous Infusion

13.2.3.1 Epidural Insertion

If the epidural is to be inserted into a patient already on a heparin infusion then **FOUR HOURS** must have elapsed, supported by a normal APTT ratio, between the infusion of Heparin being switched off and the epidural catheter being inserted.

13.2.3.2 Epidural Removal

When the epidural catheter is removed then **FOUR HOURS** must elapse between the infusion
of Heparin being switched off and the epidural catheter being removed

13.2.3.3 Post Epidural Heparin Infusion

When the epidural catheter has been withdrawn then at least **FOUR HOURS** must elapse before the infusion of heparin is recommenced

13.3 Two competent and trained staff will document and sign the cumulative dose from the last bag of fluid in the controlled drugs book

13.4 Sharps must be discarded appropriately

13.5 Any unused medication must be disposed of down the sink

13.6 The pump must be cleaned before being returned to gynaecology recovery

14 Multidisciplinary Support

All patients with epidurals in situ will be visited on a daily basis by either the anaesthetist

Anaesthetist Bleep 504

If you have any questions regarding the management of a patient with an epidural in situ then contact either the anaesthetist for advice.

15 Compliance With National Patient Safety Agency Alert (Reference NPSA/2007/21)

This epidural guideline has the following compliancy status with the following
6 recommendations from the national patient safety agency

NPSA Recommendation One

Clearly label infusion bags and syringes for epidural therapy (whether purchased commercially, manufactured by the hospital pharmacy or prepared in clinical areas) with 'For Epidural Use Only' in a large font. Make judicious use of colour and design to differentiate these products from those for administration by intravenous and other routes.
Comment: The Levobipivacaine & Fentanyl bag is clearly labelled as an epidural infusion.
Compliance Status – FULLY COMPLIANT

NPSA Recommendation Two

Minimise the likelihood of confusion between different types and strengths of epidural injections and infusions
a) Rationalise the range of epidural injections and infusions available, and introduce procedures for preparing and administering these products. Undertake an annual audit to ensure epidural practices adhere to the agreed range of products and procedures.

Comment: There exists a single epidural regime, as described in this protocol to minimize the risk of clinical error

Compliance Status – FULLY COMPLIANT

b) Maximise the use of ready-to-administer epidural infusions to help reduce the need for complex calculations and preparations.

Comment: Ready-to-administer epidural infusion bags are used for all epidural infusions

Compliance Status – FULLY COMPLIANT

NPSA Recommendation Three

Reduce the risk of the wrong medicine being selected by storing epidural infusions in separate cupboards or refrigerators from those holding intravenous and other types of infusions.

Comment: All epidural infusions and equipment are stored on a dedicated trolley, which is kept locked when not in use.

Compliance Status – FULLY COMPLIANT

NPSA Recommendation Four

Use clearly labelled epidural administration sets and catheters that distinguish them from those used for intravenous and other routes.

Comment: The epidural catheters and the epidural administration sets are dedicated for epidural use only. The administration sets have a distinctive yellow coloured stripe down the whole line.

Compliance Status – FULLY COMPLIANT

NPSA Recommendation Five

Use infusion pumps and syringe driver devices for epidural infusions that are easily distinguishable from those used for intravenous and other types of infusion. **Comment:** The Smiths medical CADD Solis pumps are dedicated for epidural use only and have a distinctive yellow colour coding.

Compliance Status – FULLY COMPLIANT

NPSA Recommendation Six

Ensure all staff involved in epidural therapy have received adequate training, and have the necessary work competences to undertake their duties safely.

Comment: All midwives have an annual update in epidural analgesia. All junior anaesthetic staff have their competency in epidural analgesia assessed on induction. **Compliance Status** – FULLY COMPLIANT

16 Patient Education

A copy of the patient information leaflet ‘Epidurals For Pain Relief After Surgery’, written by the Royal College Of Anaesthetists and The Association of Anaesthetists of Great Britain and Ireland, should be made available in the preoperative phase.

17 Actions Of Health Care Professionals

It is the responsibility of staff to be aware of their obligations to affect safe clinical care, timely recognition, and management of gynaecology patients with a temporary in-dwelling epidural catheter. Staff need to ensure up to date documentation and written follow-up care is in place.

18 Auditable Standards

18.1 Key Performance Indicators 100% availability of the document "Good Practice In The Management Of Continuous Epidural Analgesia In The Hospital Setting (2004)'

100% compliance with all recommendations from the above document.

100% Patients should have pain scores documented

100% of patients should receive care that follows the recommendations in this, and related, policies

19 Associated Policies

PCA Guideline
PONV Guideline
Infection Control Guideline

20 References

NHS National Patient Safety Agency,(2007), Patient Safety Alert 21: Safer Practice With Epidural Injections And Infusions, Ref NPSA/2007/21.

Good Practice In The Management Of Continuous Epidural Analgesia In The Hospital Setting, (2004).

Royal College Of Anaesthetists, (2006), Raising The Standards, Chapter 11 No. 10, Compliance with Royal College Of Anaesthetists Guidelines For Managing Epidural Analgesia.

22 Intranet Classification

Tags (separated by ;)	Epidural; epidural infusion; epidural analgesia;

23 Version Control Sheet

Version	Date	Author	Status	Comment
1.0	Nov 07	Consultant Anaesthetist	Archived	Policy created
2.0	Nov 08	Consultant Anaesthetist	Archived	Policy review and Updated
3.0	Oct 10	Consultant Anaesthetist	Archived	Policy reviewed and changed to guideline
4.0	Nov 2012	Consultant Anaesthetist	Archived	Guideline reviewed and Updated
5.0	Feb 15	Consultant Anaesthetist	Archived	Guideline reviewed and Updated

6.0	Mar 18	Consultant Anaesthetist	Archived	Minor update to remove acute pain nurse
7.0	Oct 20	Mark Entwistle	Archived	Reviewed and update in line with analgesia guideline
8.0	Jun 24	Consultant Anaesthetist	Current	Minor Revision – formatting and removal of one appendix

Appendix A – Competency form

Liverpool Women's NHS
NHS Foundation Trust

CADD SOLIS
YELLOW GYNAE EPIDURAL

Complete this front sheet fully and return it to the local OLM Administrator for your Department.

Name (block capitals)	
Role	
Department	
Work Telephone Number	

Having answered yes I declare that I am competent to use this device without further training.

Signed: **Date:**

I certify that the above person has undergone competency training

Key Trainer/Assessor

Signature: **Date:**

Appendix B: Competency Statement

Liverpool Women's NHS Foundation Trust

Competency Statement

ADD Solis Yellow - Epidural

HIGH RISK DEVICE – STOP

Do not use high risk equipment unless you are competent to do so

Name:		
Job Title	**Department:**	
Self-assessment of competence is required Responsibility for use remains with the user, if you are in should seek further training and education. Equipment competency can be achieved by: • attending informal and formal training sessions • supervised practice with a peer, mentor, or clinical teacher any doubt regarding your competence to use the device you • reference tools – equipment manuals/ user guides, Biomedical engineers and company representative		
Carry out an initial assessment. You must be able to answer *YES* to all the questions below before considering yourself competent to use this device. **If you cannot answer *YES* to all the initial questions, undertake education/training and then repeat the questioning process until you are able to answer YES to all the questions.** **Once you have undergone training and able to answer YES to all the questions, please sign the statement below to say that you are competent to use this device.**	Initial Assessment Date:	Final Assessment Following education/ training Date:
Please indicate whether you are able to:- **Ability To Use The Infusion Pump and Giving Set**		
1. Demonstrate how to commence an infusion on the pump?	Yes / No	Yes / No
2. Demonstrate how to switch the pump off?	Yes / No	Yes / No
3. Show how to change the battery?	Yes / No	Yes / No
4. Manage an 'occlusion' alarm?	Yes / No	Yes / No
5. Solve a 'check cassette' alarm?	Yes / No	Yes / No
6. Show how to review the programme?	Yes / No	Yes / No

7. Show how to lookup volume total?	Yes / No	Yes / No
8. Show how to lookup patient history?	Yes / No	Yes / No
9. Show how to lookup bolus history?	Yes / No	Yes / No
10. Show how to provide a bolus?	Yes / No	Yes / No
11. Show how to stop bolus partway through?	Yes / No	Yes / No
12. Describe how to clean and store the pump following use?	Yes / No	Yes / No
13. State how you would report a fault or breakdown?	Yes / No	Yes / No
14. Seek assistance if unsure?	Yes / No	Yes / No
Gynaecology:-		
1. Show how you would change the infusion rate?	Yes / No	Yes / No
2. Show how you would prepare and change the infusion bag?	Yes / No	Yes / No
Key Staff:- (Anaesthetists)	Yes / No	Yes / No
1. Correctly programme the pump?	Yes / No	Yes / No
2. Demonstrate how to purge the line?	Yes / No	Yes / No
Please indicate whether you are able to:- **Ability to Manage The Care Of A Patient Who Has An Epidural In-Situ**		
1. Understand the epidural anatomy?	Yes / No	Yes / No
2. Understand how the epidural infusion works?	Yes / No	Yes / No
3. Understand what monitoring is required?	Yes / No	Yes / No
4. Understand the frequency of monitoring?	Yes / No	Yes / No
5. Understand what documentation is required for safe management of epidurals?	Yes / No	Yes / No
6. Understand where to document the observations?	Yes / No	Yes / No
7. Check dermatome levels and understand the importance of this		
1. Check Bromage score and understand the importance of this?	Yes / No	Yes / No
2. Interpret and initiate interventions to ensure optimal patient care?	Yes / No	Yes / No
3. Recognise possible complications and initiate appropriate action?	Yes / No	Yes / No
4. Provide accurate answers for patient's questions?	Yes / No	Yes / No
5. Seek assistance if unsure?	Yes / No	Yes / No
Please indicate whether you are able to:- **Ability To Manage The Care Of A Patient When The Epidural is Discontinued**		
1. Indentify when it is appropriate to discontinue the epidural infusion?	Yes / No	Yes / No
2. Describe the process to follow when an epidural infusion is to be ceased?	Yes / No	Yes / No
3. Is able to remove the epidural catheter?	Yes / No	Yes / No
4. Know who to contact for assistance if problems are encountered when removing the epidural catheter?	Yes / No	Yes / No
5. Is able to manage the patients analgesic needs once the epidural is discontinued?	Yes / No	Yes / No
6. Seek assistance if unsure?	Yes / No	Yes / No

Original source of training External to Trust(e.g. company representative) Cascade Other please specify .....
Statement: Having answered yes to all the questions above I that I am competent to use this device without further training. Signature: Date:
Statement: I certify that the above person has undergone competency training **Key Trainer/Assessor** **Signature: Date**

Manager to retain this form in Departments Medical Devices File, practitioners to keep their own copy of their competency forms. Please forward the front copy to the OLM clerk to be uploaded on OLM.

Appendix C: Training Needs Analysis

Staff Group	Tick if relevant	Frequency	Delivery method e.g. Formal teaching e-learning Handout etc
Executive Directors			
Non-Executive Directors			
Senior Managers			
Consultant Medical Staff			
Junior Doctors			
Nurses	√	1 x Full Study Day Then Annual Updates	Formal Teaching
Midwives			
ANP			
Clinical Scientists			
Specialists allied to medicine			
Health Care annuitants			
Ancillary Staff			
Contractors			

New Epidural Bags

The National Patient Safety Agency Patient Safety Alert (NPSA/2007/21) requires us to change to ready-to-administer epidural infusions. This will be required for future CNST accreditation.

We have now purchased bags that contain: Levobupivacaine 0.1%
Fentanyl 2 □g/ml.

Benefits

1. New bags contain the safer form of bupivacaine, which is less likely to cause cardiac side effects.
2. Premixed bags are prepared in a sterile environment preventing any risk of incorrect opiate or dose.
3. Saves time in preparing bag for patient use.
4. The bags fit correctly onto square peg in the locked box.

Risks

1. Unfamiliar bag
2. New bag could be mistaken for IV fluids unless checked carefully. The bags have yellow stripes on the outer package and yellow text on the bag ("For epidural use only"). **Any unused bags must be destroyed immediately**

They are kept in the controlled drugs cupboard and will be issued in the same way as controlled drugs. To avoid any risk of accidental IV administration, the bags must be transferred from the controlled drugs cupboard to the locked box.

The protocol for administration of the new bags will be EXACTLY the same as for the old bags. i.e.

15 mls/hr infusion
10 minutes lockout
10 ml bolus

Procedure For Commencing An Epidural Infusion:-

In Gynae HDU

1. The epidural infusion bag will be checked out of the locked cupboard by two trained members of staff. The bag must be signed for in the approved fashion in the separate drug book.
2. The epidural infusion bag will be connected to the epidural infusion giving set.
3. The epidural pump must be programmed ready for the patient.
4. The epidural infusion set must now be primed must be inserted into the epidural pump.
5. . The prepared pump and infusion bag must be locked in the lockable container.
6. If an epidural bag container is opened and the bag is not used, it must be destroyed immediately.

Transfer to patient area

7. The anaesthetist may now transfer the locked device from the HDU room to the patient.

8. The Infusion bag must not be removed from the lock box under any circumstance in a patient area.

9. It is considered poor practice, and a risk to withdraw any fluid from this system with a syringe or other device and then administer to a patient.

Disposal of completed or exhausted epidural infusion

1. When the epidural infusion is finished or needs examination, the lock box must not be opened in the patient clinical area.

2. The locked box and epidural tubing should be disconnected from the patient and transferred intact back to the pharmacy room.

3. **In the Pharmacy room**, the lock box may only be opened by an anaesthetist or trained nurse. The infusion bag should be disconnected and disposed in the appropriate clinical waste bin. The infused volume of drug should be noted from the pump device and recorded in the appropriate drug administration book.

Appendix E: Gynaecology Assessment

Appendix E
Liverpool Women's Hospital NHS Foundation Trust

Gynaecology Epidural Assessment Record

Frequency of Observations

1/4 hourly - First Hour
1/2 hourly - For 2 hours
1 hourly
2 hourly
4 h o u r l y

Date	Time	Infusion Rate mls/hr	Volume Remaining	Epidural Site	Dermatome Level (T6-L2)	Leg Movement (Bromage Score)	Bolus (Tick)	Signature
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		
					L -	L		
					R -	R		

	Date	Time (T 0) Bolus Given	Bolus Amount Given	Signature	2nd Signature	
	Pain Score	Blood pressure	Respiration Rate	Pulse	Dermatome Level (T6-L2)	Leg Movement
T 0					L -	L
					R -	R
T + 5 mins					L -	L
					R -	R
T+10 mins					L -	L
					R -	R
T+15 mins					L -	L
					R -	R
T + 20 mins					L -	L
					R -	R

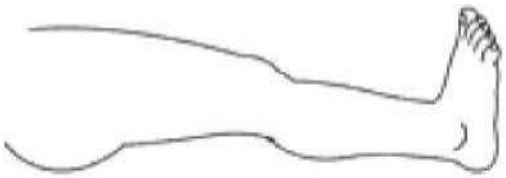
	Date	Time (T 0) Bolus Given	Bolus Amount Given	Signature	2nd Signature	
	Pain Score	Blood pressure	Respiration Rate	Pulse	Dermatome Level (T6-L2)	Leg Movement
T 0					L -	L

					R -	R
T + 5 mins					L -	L
					R -	R
T+10 mins					L -	L
					R -	R
T+15 mins					L -	L
					R -	R
T + 20 mins					L -	L
					R -	R

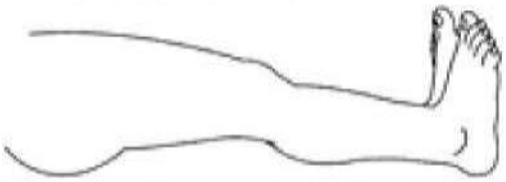
	Date	Time (T 0) Bolus Given	Bolus Amount Given	Signature	2nd Signature	
	Pain Score	Blood pressure	Respiration Rate	Pulse	Dermatome Level (T6-L2)	Leg Movement
T 0					L -	L
					R -	R
T + 5 mins					L -	L
					R -	R
T+10 mins					L -	L
					R -	R

T+15 mins					L -	L
					R -	R
T + 20 mins					L -	L
					R -	R

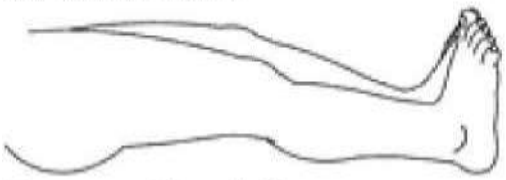
Appendix F: Bromage Scales



Bromage 3 (complete)
Unable to move feet or knees



Bromage 2 (almost complete)
Able to move feet only



Bromage 1 (partial)
Just able to move knees

Bromage 0 (none)
Full flexion of knees and feet

Appendix G: Regional Anaesthetic Techniques and Anticoagulants
Reference:http://onlinelibrary.wiley.com/doi/10.1111/anae.12359/abstract

Drug	Time to peak effect	Elimination half-life	Acceptable time after drug for block performance	Administration of drug while spinal or epidural catheter in place[1]	Acceptable time after block performance or catheter removal for next drug dose
Heparins					
UFH sc prophylaxis	< 30 min	1–2 h	4 h or normal APTTR	Caution	1 h
UFH iv treatment	< 5 min	1–2 h	4 h or normal APTTR	Caution[2]	4 h
LMWH sc prophylaxis	3–4 h	3–7 h	12 h	Caution[3]	4 h[3]
LMWH sc treatment	3–4 h	3–7 h	24 h	Not recommended	4 h[4]
Heparin alternatives					
Danaparoid prophylaxis	4–5 h	24 h	Avoid (consider anti-Xa levels)	Not recommended	6 h
Danaparoid treatment	4–5 h	24 h	Avoid (consider anti-Xa levels)	Not recommended	6 h
Bivalirudin	5 min	25 min	10 h or normal APTTR	Not recommended	6 h
Argatroban	< 30 min	30–35 min	4 h or normal APTTR	Not recommended	6 h
Fondaparinux prophylaxis[5]	1–2 h	17–20 h	36–42 h (consider anti-Xa levels)	Not recommended	6–12 h
Fondaparinux treatment[5]	1–2 h	17–20 h	Avoid (consider anti-Xa levels)	Not recommended	12 h
Antiplatelet drugs					
NSAIDs	1–12 h	1–12 h	No additional precautions	No additional precautions	No additional precautions
Aspirin	12–24 h	Not relevant; irreversible effect	No additional precautions	No additional precautions	No additional precautions
Clopidogrel	12–24 h		7 days	Not recommended	6 h
Prasugrel	15–30 min		7 days	Not recommended	6 h
Ticagrelor	2 h	8–12 h	5 days	Not recommended	6 h
Tirofiban	< 5 min	4–8 h[6]	8 h	Not recommended	6 h
Eptifibatide	< 5 min	4–8 h[6]	8 h	Not recommended	6 h
Abciximab	< 5 min	24–48 h[6]	48 h	Not recommended	6 h
Dipyridamole	75 min	10 h	No additional precautions	No additional precautions	6 h
Oral anticoagulants					
Warfarin	3–5 days	4–5 days	INR ≤ 1.4	Not recommended	After catheter removal
Rivaroxaban prophylaxis[5] (CrCl > 30 ml.min^{-1})	3 h	7–9 h	18 h	Not recommended	6 h
Rivaroxaban treatment[5] (CrCl > 30 ml.min^{-1})	3 h	7–11 h	48 h	Not recommended	6 h
Dabigatran prophylaxis or treatment[7]					
(CrCl > 80 ml.min^{-1})	0.5–2.0 h	12–17 h	48 h	Not recommended	6 h
(CrCl 50–80 ml.min^{-1})	0.5–2.0 h	15 h	72 h	Not recommended	6 h
(CrCl 30–50 ml.min^{-1})	0.5–2.0 h	18 h	96 h	Not recommended	6 h
Apixaban prophylaxis	3–4 h	12 h	24–48 h	Not recommended	6 h
Thrombolytic drugs					
Alteplase, anistreplase, reteplase, streptokinase	< 5 min	4–24 min	10 days	Not recommended	10 days

UFH, unfractionated heparin; sc, subcutaneous; APTTR, activated partial thromboplastin time ratio; iv, intravenous; LMWH, low molecular weight heparin, NSAIDs, non-steroidal anti-inflammatory drugs; INR, international normalised ratio; CrCl, creatinine clearance.

Notes to accompany Table 1

1 The dangers associated with the administration of any drug that affects coagulation while a spinal or epidural catheter is in place should be considered carefully. There are limited data on the safety of the use of the newer drugs in this Table, and they are therefore not recommended until further data become available. The administration of those drugs whose entry in this column is marked as 'caution' may be acceptable, but the decision must be based on an evaluation of the risks and benefits of administration. If these drugs are given, the times identified in the column to the left ('Acceptable time after drug for block performance') should be used as a guide to the minimum time that should be allowed between drug administration and catheter removal.

2 It is common for intravenous unfractionated heparin to be given a short time after spinal blockade or insertion of an epidural catheter during vascular and cardiac surgery. Local clinical governance guidelines should be followed and a high index of suspicion should be maintained if any signs attributable to vertebral canal haematoma develop.

3 Low molecular weight heparins are commonly given in prophylactic doses twice daily after surgery, but many clinicians recommend that only one dose be given in the first 24 h after neuraxial blockade has been performed.

4 Consider increasing to 24 h if block performance is traumatic.

5 Manufacturer recommends caution with use of neuraxial catheters.

6 Time to normal platelet function rather than elimination half-life.

7 Manufacturer recommends that neuraxial catheters are not used.

Risk factor	Normal risk	Increased risk	High risk	Very high risk
LMWH – prophylactic dose	> 12 h	6–12 h	< 6 h	< 6 h
LMWH – therapeutic dose	> 24 h	12–24 h	6–12 h	
UFH – infusion	Stopped > 4 h and APTTR ≤ 1.4	Last given < 4 h		APTTR above normal range
UFH – prophylactic bolus dose	Last given > 4 h			
NSAID + aspirin	Without LMWH	With LMWH dose 12–24 h	With LMWH dose < 12 h	
Warfarin	INR ≤ 1.4	INR 1.4–1.7	INR 1.7–2.0	INR > 2.0
General anaesthesia[a]	Starved, not in labour, antacids given		Full stomach or in labour	

Pre-eclampsia	Platelets > $100 \times 10^9.l^{-1}$ within 6 h of block	Platelets 75–$100 \times 10^9.l^{-1}$ (stable) and normal coagulation tests	Platelets 75–$100 \times 10^9.l^{-1}$ (decreasing) and normal coagulation tests	Platelets < $75 \times 10^9.l^{-1}$ or abnormal coagulation tests with indices ≥ 1.5 or HELLP syndrome
Idiopathic thrombocytopenia	Platelets > $75 \times 10^9.l^{-1}$ within 24 h of block	Platelets 50–$75 \times 10^9.l^{-1}$	Platelets 20–$50 \times 10^9.l^{-1}$	Platelets < $20 \times 10^9.l^{-1}$
Intra-uterine fetal death	FBC and coagulation tests normal within 6 h of block	No clinical problems but no investigation results available		With abruption or overt sepsis
Cholestasis	INR ≤ 1.4 within 24 h	No other clinical problems but no investigation results available		

Table 3 Relative risks related to neuraxial blocks in obstetric patients with abnormalities of coagulation.

Risk factor	Normal risk	Increased risk	High risk	Very high risk
LMWH – prophylactic dose	> 12 h	6–12 h	< 6 h	< 6 h
LMWH – therapeutic dose	> 24 h	12–24 h	6–12 h	
UFH – infusion	Stopped > 4 h and APTTR ≤ 1.4			APTTR above normal range
UFH – prophylactic bolus dose	Last given > 4 h	Last given < 4 h		
NSAID + aspirin	Without LMWH	With LMWH dose 12–24 h	With LMWH dose < 12 h	
Warfarin	INR ≤ 1.4	INR 1.4–1.7	INR 1.7–2.0	INR > 2.0
General anaesthesia*	Starved, not in labour, antacids given		Full stomach or in labour	
Pre-eclampsia	Platelets > 100 × $10^9.l^{-1}$ within 6 h of block	Platelets 75–100 × $10^9.l^{-1}$ (stable) and normal coagulation tests	Platelets 75–100 × $10^9.l^{-1}$ (decreasing) and normal coagulation tests	Platelets < 75 × $10^9.l^{-1}$ or abnormal coagulation tests with indices ≥ 1.5 or HELLP syndrome
Idiopathic thrombocytopenia	Platelets > 75 × $10^9.l^{-1}$ within 24 h of block	Platelets 50–75 × $10^9.l^{-1}$	Platelets 20–50 × $10^9.l^{-1}$	Platelets < 20 × $10^9.l^{-1}$
Intra-uterine fetal death	FBC and coagulation tests normal within 6 h of block	No clinical problems but no investigation results available		With abruption or overt sepsis
Cholestasis	INR ≤ 1.4 within 24 h	No other clinical problems but no investigation results available		

LMWH, low molecular weight heparin; UFH, unfractionated heparin; APTTR, activated partial thromboplastin time; NSAID, non-steroidal anti-inflammatory drug; INR, international normalised ratio.

*Although general anaesthesia is not a risk factor per se for coagulation complications, it is included in this Table to highlight that the alternatives to regional anaesthesia are not free of risk; thus a risk–benefit comparison is required when choosing one over the other. See notes below.

Notes to accompany Table 3

Risks: The risks are primarily those of vertebral canal haematoma with subsequent cord compression and permanent damage. Realistic alternatives to epidural analgesia exist in labour, but, for caesarean section, the choice is that of general or neuraxial anaesthesia, and the risks of spinal haematoma in patients with abnormal coagulation must be weighed against those of general anaesthesia, especially in patients who are in labour and have a full stomach. These risks include hypoxaemia associated with difficulties maintaining the airway, pulmonary aspiration and thromboembolic complications.

Low platelets: The debate regarding the safety of neuraxial blockade in women with thrombocytopenia is guided by expert consensus opinion in the absence of clinical trials; it is not therefore possible to give definitive values for a lower limit at which there is an increased risk of haematoma. For normal healthy women, there is no increased risk of complications with platelet counts > 100 × $10^9.l^{-1}$ [4]. A count of > 75 × $10^9.l^{-1}$ has been proposed as an adequate level for regional blocks when there are no risk factors and the count is not decreasing [5]. In pre-eclampsia, a decreasing platelet count is accompanied by other coagulation abnormalities, and this is assumed to be the case once the platelet count decreases to below 100 × $10^9.l^{-1}$. If the platelet count is below this value, a coagulation screen should be performed – if this is normal, it would be reasonable to perform a regional block down to a level of 75 × $10^9.l^{-1}$, depending on the rate of decrease in platelet count [6]. In idiopathic thrombocytopenic purpura and gestational thrombocytopenia, there are reduced platelet numbers, but normal function. In these situations, expert opinion is that an experienced anaesthetist might reasonably perform a neuraxial blockade providing the platelet count is > 50 × $10^9.l^{-1}$ and stable, but an individual risk–benefit assessment should be made [7–11]. It is possible that spinal anaesthesia with platelet counts below this level may be safe if data are extrapolated from that derived from lumbar punctures in non-pregnant patients performed by haematologists using needles considerably larger than those used by obstetric anaesthetists [9]. A stable level of 40 × $10^9.l^{-1}$ may be safe for lumbar puncture in the absence of other coagulation abnormalities.

The platelet count should be checked before any neuraxial procedure if there is any suspicion of decreasing platelet numbers during routine antenatal testing, signs of the development of pre-eclampsia, e.g. proteinuria or hypertension, or other clinical features suggesting coagulopathy, placental abruption or if the patient has been given recent anticoagulant therapy. Platelet numbers can decrease in patients treated with regular heparin for > 4 days. Otherwise, it would not be routine to check platelet numbers and delay neuraxial block whilst these results are awaited. It would be standard practice to perform a neuraxial procedure within 6 h of the last platelet count and clotting studies in patients with mild or moderate pre-eclampsia. However, if the patient has severe or fulminating pre-eclampsia or HELLP syndrome, a platelet count and clotting studies should be checked immediately before performing the procedure, as decreases in platelet count can occur rapidly in these circumstances.

Low molecular weight heparins with aspirin: Treatment with daily LMWH and aspirin 75 mg may be encountered when following NICE guidelines, which recommend low-dose aspirin for obesity or hypertension. Provided the LMWH is stopped for > 12 h, the platelet count is > 75 × $10^9.l^{-1}$ and normal coagulation is confirmed, neuraxial blocks can be categorised as 'increased risk' only.

Intra-uterine fetal death: After intra-uterine death, there is an increased risk of coagulopathy and sepsis, especially in the second week after fetal demise. Coagulation abnormalities can occur on presentation in about 3% of women with apparently uncomplicated intra-uterine death, and this increases in the presence of abruption or uterine perforation to around 13% [12]. It is therefore prudent to check coagulation status before any regional procedure. The onset of coagulopathy is variable, but can be rapid.

Cholestasis: In obstetric cholestasis, coagulopathy may develop as a result of decreased absorption of vitamin K essential for activation of clotting factors. It is important to check coagulation before regional blockade, but changes do not occur rapidly.

Removal of epidural catheters: The recommendations given in Table 1 for the removal of epidural catheters should be noted.