# Management of fractured neck of femurs in the Emergency Department: Improving the Fast Track Pathway.

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# FRCEM QIP Declaration 18<sup>th</sup> December 2017

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#### Abstract

*Introduction: -* Patients at **Constant of Section** with a fractured neck of femur were previously managed with a fast track pathway that was last updated in 2011. This fast track pathway was not being used as it was found to be complicated, out of date and actively exclude more patients than it included.

*Aims: -* To employ quality improvement methodology to design a new fractured neck of femur pathway that: ensured 90% of patients receive a diagnostic X-ray within one hour, reduce overall time in the Emergency Department and introduce Facia Iliaca Compartment blocks as an additional form of analgesia.

*Methods:* - Driver diagrams were used to set out the aims and objectives and a Plan Do Study Act cycle was used to facilitate change. Data was taken from the previous year to identify the delay in diagnostic imaging and establish that the current neck of femur pathway was not working. A new neck of femur pathway was created with input from several stakeholders including Yorkshire Ambulance Service, Radiology, Radiation Safety team, Orthopaedics, Anaesthetics, Pharmacy and the Emergency Department.

**Results:** - 130 patients were coded as having a fractured neck of femur between 2nd February 2017 and 28th April 2017. The number of patients placed on a nurse initiated pathway increased from 30% to 72%. The time to diagnostic imaging fell to 57 minutes from 118 minutes. Time spent in the Emergency Department reduced slightly to under the 4 hour Emergency Care Standard. The number of Facia Iliaca Compartment Blocks performed in the Emergency Department increased dramatically from 9% to 64% of all patients.

**Conclusions:** - Following implementation of the new neck of femur pathway, there was an improvement in the overall patient care by receiving faster diagnostic imaging, having a definitive orthopaedic bed booked quicker, having the option to receive a local anaesthetic compartment block as additional analgesia and spent less time on average in the Emergency Department. The new fractured neck of femur pathway continues to be used in

and will be reviewed and re-audited between 6 - 12 months to hopefully show sustained improvement.

#### **Patient Case**

Mrs M presented to the **Service** after slipping on ice whilst walking. She had a suspected left Yorkshire Ambulance Service after slipping on ice whilst walking. She had a suspected left fractured neck of femur. She waited for a cubicle to become available before being transferred to an Emergency Department trolley. Mrs M was vetted and assessed as part of the **Service** fractured neck of femur pathway. It was clear that her left leg was shortened and externally rotated.

She was undressed and placed in a hospital gown, cannulated and given intravenous paracetamol and morphine for her pain. At this point Mrs M had been in the Emergency Department for 50 minutes. Mrs M was then sent for an X-ray of her left hip and pelvis. She was wheeled round to the Emergency Department X-ray and waited 20 minutes for an X-ray to be taken. Mrs M then had to wait another 20 minutes to be transported back round to the Emergency Department. At this point Mrs M's Emergency Department card had been placed to be seen in time order.

At 3 hours and 44 minutes Mrs M was picked up by an Emergency Department Junior Doctor who looked at the X-ray, correctly diagnosed an intracapsular fracture of the left hip and referred her to the orthopaedic team. Just after 4 hours Mrs M had an orthopaedic bed booked by the nursing staff and waited a further hour in the Emergency Department before an Orthopaedic bed became available. By the time she arrived and was transferred to a bed her analgesia had worn off and she remained uncomfortable until she was reviewed on the ward by the orthopaedic medical team 3 hours later. She received her left hemiarthroplasty 48 hours later on the trauma list.

#### Introduction

The **Constant of the major trauma centre for West Yorkshire and sees** over 120,000 Emergency Department attendances each year. It is the receiving hospital for orthopaedic emergencies in the

Osteoporosis is the leading cause for fragility fractures causing 9 million fractures worldwide, with 300,000 fragility fractures presenting to hospital in the United Kingdom a year. 65,000 of these presentations were a fractured neck of femur in England and Wales<sup>1</sup>.

The orthopaedic service at **service** is available 24 hours every day of the year. For patients being admitted with a fractured neck of femur (NOF) there is a designated NOF theatre list Monday to Friday with potential space on acute trauma lists every day.

whose best practice care for NOF fractures. This breaks down into six key stages standard care. If met, these standards of care not only benefit the patient in terms of recovery and discharge, but also attract a best practice tariff (Table 1)<sup>2</sup>. The data is inputted weekly into the National Hip Fracture Database (NHFD).

#### Table 1: Best Practice Criteria

1. All patients with hip fracture should be admitted to an acute orthopaedic ward within 4 hours of presentation to the Emergency Department

2. All patients with hip fracture who are medically fit should have surgery within 36 hours of admission, and during normal working hours

3. All patients with hip fracture should be assessed and cared for with a view to minimising their risk of developing a pressure ulcer

4. All patients presenting with a fragility fracture should be managed on an orthopaedic ward with routine access to acute orthogeriatric medical support from the time of admission

5. All patients presenting with fragility fracture should be assessed to determine their need for antiresorptive therapy to prevent future osteoporotic fractures

6. All patients presenting with a fragility fracture following a fall should be offered multidisciplinary assessment and intervention to prevent future falls

When the patient is booked into Emergency Department the clock starts for achieving the best practice of care. Patients with a NOF are a group of patients where we know admission is inevitable and need to be transferred to a definitive place of care.

The majority of Emergency Departments have a "fast track" or "NOF pathway" implemented to ensure smooth transition to an orthopaedic bed base. Although a NOF pathway should reduce the time span in the Emergency Department there is no evidence that it reduces morbidity, mortality or length of stay<sup>3</sup>. The suggestions made by the British Orthopaedic Association (BOA) to what a fast track pathway should provide include<sup>1</sup> : -

- Rapid diagnosis with plain films
- Analgesia
- Routine investigations such as UE's, FBC, Group and Save and ECG)
- Pre-operative chest X-ray unless contraindicated
- Assessment of other injuries or relevant medical conditions.

The Royal College of Emergency Medicine (RCEM) also have four core standards that should be met when managing a patient with a NOF fracture. These are<sup>4</sup>: -

- 1. Pain managed as per RCEM standards
- 2. 90% of X-rays completed within 60 minutes of arrival
- 3. 75% of patients with a NOF fracture referred within 120 minutes of arrival
- 4. Admitted within 4 hours of arrival.

does have a NOF fast track system in place. However, it was branded as complex, not user-friendly and out of date. It excluded the majority of patients and was therefore unpopular and very rarely used. As a result of this, a patient with a suspected NOF fracture was often sent for departmental images and placed in waiting time order. This meant that when the department was busy, a patient with a NOF fracture often waited hours before being confirmed as having a fracture and being referred late with little or no further interventions being performed.

Analgesia is obviously important for the patient, and as well as the RCEM standards the National Institute of Clinical Excellence (NICE) have published guidance on managing pain in a patient presenting with NOF fracture<sup>5</sup>. This includes: -

#### NICE Hip Fracture Management CG 124: - pre-operative analgesia5:

- Regular paracetamol
- Opiates
- NSAID contraindicated
- Consider a nerve block if paracetamol and opiates not controlling pain

Nerve or compartment blocks were never a feature in the **second** fast track pathway. Often there was not time to perform a block, especially if there had been a late decision to admit and any further delay to definitive care was to be avoided.

There is good evidence to suggest that local anaesthetic blocks in NOF fractures provided safe, effective and long acting analgesia. There has been several studies that have shown that when using a local anaesthetic block there is a significant reduction in reported pain scores. A reduction in delirium and reduction in opiates use, the administration of which takes up valuable nursing or medical time, can have significant side effects such as respiratory depression<sup>6-9</sup>.

Another limitation in providing local anaesthetic blocks is the high turn around of junior medical staff. This normally means that procedures are left to senior decision makers who are often busy either managing the department or assessing acutely unwell patients.

The specific aims of this project are to improve the **fast** track NOF pathway to help facilitate the patients journey to definitive care and minimise time in the Emergency Department. The project looks at ways in which a local anaesthetic block could be utilised to offer patients long acting good quality analgesia. This report will lay out the specific quality improvement methods employed to identify and improve management of fractured NOFs in the Emergency Department, an analysis of the data and a reflection on how we might improve this process in future.

#### Methods

Before starting the project the aims and changes were initially laid out in a driver diagram. A template was adapted from the Institute of Healthcare Improvement (IHI) website. A driver diagram provides a visual display to what "drives" or contributes to the completion of the project aim.

"A driver diagram shows the relationship between the overall aim of the project, the primary drivers that contribute directly to achieving the aim, the secondary drivers that are components of the primary drivers, and specific change ideas to test for each secondary driver<sup>10</sup>."

The driver diagram was useful as it helped me and the Emergency Department team involved in the process to focus on the key areas required to make the project work. It was decided that the main outcome should be ensuring that patients with a fractured NOF should be admitted to an orthopaedic bed base within four hours with 90 % of patients having a diagnostic plain film and decision to admit within 60 minutes of arrival in the Emergency Department. The target of 90% of patients was chosen as it is a recognised RCEM standard for time to diagnostic imaging in patients with a fractured NOF.

#### Figure 1: Driver Diagram For Fractured Neck Of Femur QI Project



After further research on quality improvement methodology I decided that a PDSA cycle (Plan, Do, Study, Act) would be most relevant to this project<sup>11</sup>. The PDSA cycle has two parts. The first is made up of three fundamental questions: -

- 1. Aims of the project. "what we are trying to accomplish?"
- 2. Establishing Measures. "How will we know the changes have been an improvement?"
- 3. Selecting Changes. "What change can we make that will result in improvement?"

#### Figure 2: PDSA cycle for improving the NOF pathway



The second part is the actual PDSA cycle. This tests changes in the real life work setting this consists of four stages. The first stage is the "plan" stage. This is where the need for improvement and change is identified (figure 2).

The second stage is the "do" stage. This is where the change is implemented into normal working practice. The third stage is the "study" stage. This is where the data is collected and evaluated to see if the change has made any improvement or not. The fourth and final stage is the "act" stage. This final stage helps to identify where any modifications are needed and how to proceed into a new cycle of improvement.

The first challenge was to confirm that there was a problem with the current fractured NOF pathway. With the help of a colleague (Dr Clare Arneil), we reviewed all the patients that were diagnosed with a fractured neck of femur at the fractured and presented between the 1st April 2015 and 31st March 2016. A combination of data from the Emergency Department's electronic patient tracking pathway "Symphony" and electronic scanned records using either winDip or PPM was used to review the case notes.

376 patients cases with a confirmed fractured NOF notes where evaluated. A further 32 patients were excluded as either an incorrect diagnosis was entered (12), missing or unable to open the electronic record (15) or the patient was admitted to the major trauma bed base (5).

The current fractured NOF pathway was used in only 112 patients (29.7%). A retrospective review of the case notes suggested that 319 patients (85%) would have been eligible to have been placed on the fast track NOF pathway.

The time taken to receive diagnostic imaging was worked out from the time the X-ray was requested on Symphony to the time that X-ray was uploaded in real time on the PACS system. Only 60 patients managed to have a diagnostic X-ray performed within 60 minutes, with the vast majority of patients (59%) receiving their X-rays between 90 - 120 minutes. On a monthly average only about 20% of all patients with a suspected fractured NOF managed to receive a diagnostic X-ray in 60 minutes or less.

Figure 3: Percentage of diagnostic X-rays performed in 60 Minutes or

less



36 (9%) patients were documented to receive a FICB while in the Emergency Department.

It took the majority of patients (75%) more than two hours to have an orthopaedic bed booked on Symphony. Not one patient had a bed booked within the hour of presenting to the Emergency Department. This is probably due to multifactorial reasons. When the patient arrives in the Emergency Department it takes at least thirty minutes for the patient to be handed over, cannulated, given analgesia, have an ECG performed and undressed in order to be ready for X-ray. The patient then has to wait for a porter to take the patient round to the Emergency Department X-ray. There can also be a wait for the patient to

actually then be X-Rayed. The patient then has to wait for a porter to bring them back to the Emergency Department and often the patient waited for a clinician to review the results in time order.

From an Emergency Department perspective the patient presenting with an isolated fractured NOF should be a straightforward process of analgesia, diagnosis and admission to definitive care. However, the current NOF pathway did not seem to speed that process up.

The main problem appeared to be the delay in diagnostic imaging. Improving this in theory should speed up the referral and bed booking process. Understandably the Orthopaedic team were not keen to accept an admission without x-ray confirmation of a fractured NOF. I drew up a process chart to ascertain where the delays occurred in diagnostic imaging.

### Figure 3 Process map of old NOF pathway



Meetings and emails (Appendix 1) between the Emergency Department and the Radiology team were set up to see if we could try and speed up the diagnostic imaging process for patients with a suspected fractured NOF. Initially it was thought that we could simply book an X-ray room and have the patient wheeled straight round to radiology. However, when this was tried a lot of time was still lost waiting for the patient to be transferred to Radiology and return, and unless the Emergency Department was quiet this did not appear to work.

I then raised the possibility of acquiring a mobile AP Pelvis of the patient while they were in the Emergency Department, as our Radiology team had new mobile X-ray machines with realtime digital viewers built in. Greater then 90% of NOF's are detected and therefore diagnosed on the AP view<sup>12</sup>. This means that a clinician could confirm a fracture within seconds and start the referral and admission process much quicker.

A PubMed search with the criteria "neck of femur" and "AP film" produced 6 search results, only one of these was relevant to supporting use of an AP pelvis in the diagnosis for a fractured neck of femur.

In the paper "Another fractured neck of femur: do we need a lateral X-ray? (2011)<sup>12</sup>" from the British journal of radiology, a panel of orthopaedic consultants reviewed hip fractures over a year. they were blinded and asked to comment on the AP films and comment on the diagnostic classification and operative management. They were then shown the lateral films and asked if this made any changes to their original opinion. All results were compared to the gold standard, which in this case was the operative notes that which confirmed the diagnosis.

The authors concluded that lateral films did not aid the diagnosis of a fractured neck of femur but should be used if the fracture on the AP pelvis is intracapsular and appears undisplaced. The reason for adding a lateral view in these case, is if displacement has occurred it will change the operative management from a dynamic hip screw to a hemiarthroplasty.

Although this paper has some strengths, for example the question was relevant, the population size and demographics are similar to those in West Yorkshire. It should be noted that this was an retrospective observational study and thus does have the potential for bias, mainly recall bias and diagnostic review bias. Potentially those on the orthopaedic panel who reviewed the films could have have perviously seen the images or even operated on some of the patients.

From a patient analgesic perspective this would also mean that a FICB could be placed earlier in the patients journey, providing a longer lasting analgesic option which would reduce side effects of intravenous opiates and also the burden to nursing staff of administering them.

The Radiology department were happy for this to go ahead as it would benefit the patient's overall experience. The Orthopaedic team still insisted on having a formal lateral hip view and chest X-ray but were happy to accept a mobile AP pelvis in isolation to confirm the diagnosis, providing it contained the entire pelvis. Radiology set up their own mobile NOF standard operating procedure (Appendix 2) meaning that only one request card needed to be generated and they would repeat any unsuitable AP pelvic films once the patient attended for their departmental lateral and chest film.

The next hurdle was where should a portable AP pelvis be done in the Emergency Department? The initial answer was in the resuscitation room. However, being a major trauma centre, space in resuscitation room can be precious and moves nursing resources from the main department. Also, having a fractured hip should not be reason to occupy a resuscitation bay .

I set up a meeting with **Constant of** Radiation Safety Officer who evaluated the Emergency Department and confirmed that, along with the resuscitation room, one of the high dependency cubicles had enough space and protective lead shielding to accommodate a mobile AP pelvis.

This then prompted the discussion about getting a pre-alert from the Yorkshire Ambulance Service (YAS) so the appropriate cubical could be made ready. This would not only benefit the patient as they are not waiting on a ambulance trolley, but would also help he ambulance crew to hand over quickly and get back on the road. I contacted the YAS

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Medical Director who was happy to filter this down to the West Yorkshire crews.

The next issue to be addressed was the actual content and format of the new fast track pathway. An Emergency Department team was established composing of myself,

Consultant , ED link NOF nurse and Pharmacist

The new pathway had to be simple and easy to follow, with checklists showing that certain tasks and basic interventions have been done, for example blood tests, ECG and X-rays. It would be used on the "obvious" query fractured NOFs who would need minimal involvement from the Emergency Department. The pathway was discussed several times at the monthly Fractured Hip governance meetings which bought Orthopaedic, Anaesthetic, Emergency Department teams together.

It was agreed that all patients should also receive an intravenous cannula and a slow bag of Hartmans to help keep the patient hydrated. One observation that was made is that analgesic prescribing for a fractured NOF can be sometimes varied, with a range of different medications via different routes of administration being prescribed. The new pathway should standardise what analgesia should be used as per NICE guidance.

Local Anaesthetic blocks for hip fractures have a good evidence base in literature. A *"Medline"* search with the criteria " Emergency Department", "Facia iliac compartment block" and "Fractured neck of femur" produced 72 papers since 2001. Out of these results 4 papers were used to support the use of local anaesthetic block in the management of fractured neck of femurs.

The evidence in using local anaesthetic blocks is a reduction in the patient's pain on both numerical and visual analogue scales. They are also opiate sparing, long acting and reduce delirium t <sup>6-9</sup>. Local anaesthetic blocks provided are either Facia Iliac compartment blocks or femoral nerve (3 in 1) block. There is little to no difference in the analgesic effectiveness between the different types of local anaesthetic blocks that can be administered for a fractured neck of femur, especially in the hands of a skilled operator.

In **Constant** local anaesthetic blocks for fractured NOFs were not routinely performed, with less then 10% being performed in the Emergency Department over the period of a year. Documentation was noted as being poor as the local anaesthetic was not prescribed correctly or the procedure was not written in the notes. Often the only indication that a local anaesthetic block had been performed was by the presence of a puncture site detected in the anaesthetic room.

As there is good evidence on the effectiveness of local anaesthetic blocks in fractured neck of femurs and it is recommended in the NICE guidelines, we wanted to bring in standardised way to perform and document any blocks performed in the Emergency Department. This was well received by both the anaesthetic and orthopaedic team. However, it was stressed that not all patients may be able to receive a local anaesthetic block and that patient's transfer to a definitive bed base should not be delayed if a block could not be administered.

After attending a course on "Providing a fascia iliaca block service for fractured neck of femur" provided by the AAGBI in January 2016. We opted to use Facia Iliaca Compartment blocks (FICB) as it is an easy technique to learn with an excellent safety profile. FICB differ from a nerve block as the local anaesthetic is injected into potential space that lies under the facia iliaca<sup>13</sup>. Unlike a femoral nerve block which uses a small volume of local anaesthetic just to act on the femoral nerve, a FICB is a volume dependant block that fills the potential compartment space to not only anaesthetise the femoral nerve but also the lateral cutaneous nerve of the thigh and potentially the obturator nerve.

Taking advice from AAGBI course we will use a single local anaesthetic as mixing short and long acting agents potentially reduces the therapeutic safety index. The volume of solution used would be standardised at 40ml Bupivicane 0.25%. If the patient was deemed to be less than 50Kg a maximum dose of 2mg/Kg would be used and the reaming volume made up to 40ml with 0.9% normal saline.

When asking both the Emergency Department medical and nursing teams their opinion about introducing FICB to the pathway, everyone was supportive of this idea. However, the senior nursing staff were concerned that often the only clinicians able to perform a local anaesthetic block were the senior decision makers (SDM), who are often too busy dealing the major trauma or running the department. Like the majority of Emergency Departments the has a high turnover of junior medical staff on rotation so it would be difficult to ensure all staff are trained to perform a FICB. Emergency Departments in general like the idea of providing FICB but a survey showed that the main reason for not providing such a service was the lack of available and trained staff<sup>14</sup>. It was decided that as well as the department's senior decision makers the Advanced Nurse Practitioners (ANP) would be trained to perform a FICB, as they are permanent staff who would be able to provide a consistent service. FICB also have the advantage of not needing a physician to perform them unlike femoral nerve blocks which the AAGBI deems should only be performed by a doctor<sup>15</sup>.

Training sessions were delivered to all the ANP's during their protected teaching time. There was a joint teaching session provided by myself and a HST in anaesthetics Dr who was undertaking a fellowship in regional anaesthesia. The sessions included a didactic session on local anaesthetic calculations, safety and toxicity. As well as a practical session using a phantom to teach both an in plane ultrasound guided and landmark technique. The ANP's preferred using the ultrasound guided method as it increased their confidence in performing the procedure from both the tactile and visual feedback. The ANP's were supervised by either a HST or consultant on the shop floor until the ANP was happy to perform independently. Further "top up" teaching has been arranged on an annual basis to reinforce knowledge and educate new ANPs joining the team.

One piece of feedback from the medical team was that a lot of time was wasted finding equipment to perform a FICB. As a result I put together a "block box" containing all equipment and local anaesthetic to perform a FICB. This was added to the nursing staff stock rota so it would be replenished every day although an honesty policy is used so stock is replaced when used.

#### Implementation

The results of the initial audit were presented at the Emergency Department's monthly clinical governance meeting to explain the proposed changes to the neck of femur pathway. Funding in the form of a cost code was approved by the department's business manager so I could use the Trust's Medical Illustration department to design and print hard copies of the new pathway. The creation of the new pathway took six months to design and needed to be redesigned several times before it was signed off and approved by all stakeholders involved (Appendix 3).

The launch of the new pathway was scheduled for the 2nd February 2017 and was announced in several places. Firstly at a monthly ED forum in January so staff could have an open question and answer session. The new pathway was uploaded to CEMBOOKS a system used by **several** as an online ED handbook. It was also uploaded and announced on the department's Facebook page as well as notices placed in the staff and handover rooms.

The ED link nurse spent two weeks prior to the launch teaching fellow nursing and healthcare staff about the new pathway while on the shop floor as well as mentioning it at nursing handover. Consultants mentioned the new pathway during doctors handover in the week before the pathway launched.

The radiology team leaders were made aware of the implementation date and ensured all radiographers were aware of the mobile pathway.

#### Results

The new neck of femur pathway went live at 8am of the 2nd February 2017 as scheduled. Data of all neck of femurs were collected on a weekly basis and analysed after three months. A total of 130 patients were diagnosed and admitted with a fractured neck of femur at the **second second secon** 

Overall there was an increase in the number of patients that were placed on the fast track neck of femur pathway with 72% of patients being placed on a nurse initiated pathway. Time to diagnostic X-ray fell from an average of 127 minutes down to 57 minutes. If you look just at the proportion of patients that had a mobile AP pelvis (53%) the average time to diagnostic imaging fell to 41 minutes. A run chart was plotted to see the effect.



The data was averaged on a weekly basis and plotted against time to diagnostic imaging in minutes (run chart 1). There was a dramatic fall in the time to X-ray when the new pathway was implemented to under the one hour standard suggested by RCEM (red dotted line). The overall trend (shown by the green line) shows a reduction in time to X-ray. There are a couple of spikes above the one hour target. Looking at these spikes the delay in diagnostic X-ray was effected by a busy ED and a mobile AP pelvis was unable to be performed. There was also a handful of patients that were identified as being a potential fracture later on in their ED journey, thus delaying their diagnostic imaging until they had been assessed by a clinician in time order.



Another way to show that the time to x-ray improved is that the overall percentage of patients receiving a diagnostics film within 60 minutes increased to an average of 72% of patients with some weeks hitting the RCEM standard of 90% or greater (run chart 2). Time on booking an orthopaedic bed for patient's which in **Section** is known as "To Come In" or "TCI" fell from an average of 178 minutes to 112 minutes once the new pathway was introduced. Total time in the Emergency Department fell from an average of 300 minutes to an average of 238 minutes.



The "TCI" run chart above (Run Chart 3) took the average weekly data and shows again an overall downward trend (green line) in the time before an orthopaedic bed base was booked, with the majority of patients getting a bed booked under the RCEM two hours standard. There are some spikes above the 2 hour standard occurring post the new pathway implementation. This was mainly due to single patients skewing the data with

having delayed decisions. For example this may have been due to having ongoing medical intervention in the department, or the patient deteriorating in the department and requiring review by critical care before acceptance to a level 2 bed.

Overall there was a downward trend in the time patient's spent in the Emergency Department (Run Chart 4). There was one spike that was due to a mixture of long clinician and bed waits.



As shown in the run chart 5 below, the number of FICB dramatically increased with 83 patients (64%) receiving a local anaesthetic block in the Emergency Department . Prescribing and documentation of a FICB improved with the new pathway. Patient pain scores continued to be poorly documented. However, nursing staff both in the Emergency Department and on the orthopaedic wards noted an improvement in patient comfort post FICB, especially when rolling or placing the patient on a bed pan.



#### Discussion

This was the first time I had attempted a quality improvement project and I was surprised by the length of time that it took to complete overall. There have been some logistical issues when trying to set up meetings with stakeholders. This was due to a mixture of split site working and rota commitments. There was a long delay in getting the new pathway created through the Trusts Medical Illustrations Department who unfortunately were understaffed due to long term illness combined with numerous drafts that were rejected until all stakeholders were happy with the layout and wording.

As result my QIP project over ran and was also hampered by my rotation to another trust which made the coordination and implementation of the new pathway difficult.

Overall there was an improvement in time to diagnostic X-ray, reduction in stay in the Emergency Department and an increase in the number of FICB. There was however a few problems that occurred. A total of 16 adverse incidents (Datix) were recorded in the first three months. 15 of these were filed by the radiology department as these patient's had only received a mobile AP pelvis view and consequently had to be sent back down from the wards to complete their full X-ray series. Although there was no harm to the patient's documented, it did mean they had to be moved unnecessarily and potentially could have delayed their operation.

The other Datix was filed by the orthopaedic team as a patient was fast tracked through the ED when they had other complex medical needs that should have first been addressed. As a result of this we changed they pathway slightly to incorporate a national early warning score (NEWS) cut off of greater or equal to three (Appendix 4). This cut off is given to GP referrals and deemed locally to be safe and pick up any neck of femur patients that were also "sick" and needing to be reviewed in the Emergency Department.

We also added a large note at the bottom of the pathway to remind all medical and nursing personnel to send the patient for a departmental lateral and chest X-ray. Since this there have been no further adverse events recorded.

Although the new NOF pathway appears to have had an overall positive effect on the department, further work is required to continue improvement. Regular audit cycles should be performed to see if standards are being maintained and the new pathway is being

used. I suspect that times to diagnostic X-ray will have dropped and this is likely due to a high turnaround of nursing staff with a large volume of newly qualified nurses needing to be trained. Also the lead ED neck of femur link nurse (JW) has changed jobs so we have lost the "shop floor" drive and awareness.

The time spent in the Emergency Department was reduced, however this was not a drastic reduction but appeared to ensure that the 4 hour emergency care standard was met. On reflection, even if there is an early diagnosis and orthopaedic bed booked, the patient still has to wait in the Emergency Department until a bed to becomes available. In the future

plans to have a dedicated hip fragility unit. Until that becomes a reality it is likely bed pressures will continue to hold patients with fractured NOFs in the Emergency Department.

In terms of cost effectiveness the addition of a FICB will not have saved the Emergency Department any money. As it is a volume dependant local anaesthetic block multiple vials of bupivicane which per patient are three time more expensive then a single vial of morphine sulphate. As well as this the additional uses of consumables such as nerve block needles and sterile dressing packs will mean the price spent per patient will increase.

However, despite the cost the patient was given a better experience if offered a FICB with analgesia lasting longer. There is also the added benefit of reducing the workload on nursing and medical teams in prescribing and administrating repeat analgesia.

On a positive note, it appears FICB continues to be done with more medical and ANP wanting to be trained. I have even been approached to teach FICB at regional teaching for the ST3+ cohort of emergency medicine trainees.

There are improvements that could be made if I was to run the project again. Firstly I would include a set prescription on the pathway documentation rather than a tick list suggesting what to prescribe. This would reinforce standard prescribing and reduce the amount of paperwork as currently the traditional ED card is required to prescribe analgesia and a separate prescription chart is required for intravenous fluids. This may be easier with the introduction of electronic prescribing that is coming the Emergency Department in the near future.

Another improvement would be to provide an online training video for FICB to the the online departmental e-induction. This is a virtual platform that can be accessed by all medical staff and would give the junior tier of doctors a basic understanding of how to perform a FICB.

This Quality Improvement Project was a challenging but useful experience. It allowed me to learn about numerous quality improvement methods and use them to produce a piece of work relevant to our Emergency Department. As I progress to a consultant position it will be increasingly important to understand these concepts to help and guide the next generation of registrars through their quality improvement project for their FRCEM.

In summary the new fractured hip fast track pathway at **the second secon** 

### Funding

The Emergency Department provided a cost code so I could use Medical Illustrations to design and print the new NOF pathway.

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# Appendix 1 Journal summery of meetings and emails throughout the

## <u>QIP</u>

Date	Event	Summary of Minutes/Comments
December 2015	QIP Idea	Discussion with ED consultant and elderly lead about improving the NOF pathway and maybe include FICB
Jan 2016	AAGBI (London)	One Day teaching on setting up a FICB service for # NOFs essential learning single (not mixed LA) should be used for safety. Ultrasound guided is now the preferred way. Because facia iliac are compartment blocks registered allied healthcare professionals can perform once trained.
March 2016	Audit	Audited data from # NOFs from the previous year showed a delay in time to X-ray poor use of current # NOF pathway. Note: the main problem appears to be a bottleneck around diagnostic imaging
April 2016	ED Forum	Present data to ED consultants and Nursing staff with view to rewrite and Update the current pathway. Business manager happy to supply cost code for medical illustrations.
May 2016	Hip fracture governance meeting	Meeting with Orthopaedics hip lead Anaesthetic lead for hips and along with orthopaedic allied healthcare professionals (e.g. Phiso OT, fragility nurse specialist). All in agreement that current pathway not being used well, if at all. Happy for pathway to be improved. : - Only request is that all bloods ECG and X-Rays are performed in the ED. No issues with a FICB being introduced : - In addition all patients should have IV access and a slow bag of IV fluids (Hartmanns) started. Also happy for FICB to be done. Offered support for training as has a post CCT registrar doing a fellowship in regional anaesthesia.
June 2016	Teaching ANPs FICB	<ul> <li>Myself (1), (1) the regional anaesthesia fellow and ED consultant (1) teaching ED ANPs to put in FICB.</li> <li>: - theory of LA including LA toxicity (1) - History of FICB, the evidence and series of videos showing landmark and ultrasound techniques. (1) - Knobology of ultrasound and using a phantom to get techniques of using ultrasound to guide a needle for FICB.</li> <li>Suggested getting DOPS on FICB to gain confidence to perform independently.</li> <li>Feedback from teaching was positive, with request for repeated sessions as new cohort of ANP are appointed (1 -2 session a year).</li> </ul>

Date	Event	Summary of Minutes/Comments
June 2016	NOF Imaging	Delay in diagnostic X-ray is still greater than 1 hour even when radiology alerted. Suggestion from another ED consultant about mobile AP pelvis to speed up diagnosis. Tried on a handful of suspect NOF fractures in Resus. Time to diagnostic X-ray falls to below 10 minutes. Emailed Radiology supervisors and and a supervisor and about the possibility of using mobile X-Ray. Can this be done in the HDU cubicles in ED main area? Suggested a meeting and request radiation safety officer to attend.
June 2016	Hip fracture governance meeting	Discussion with <b>Mathematic</b> (ortho) about mobile X-ray. Happy to support providing the images are of good quality and include the iliac crests to the greater trochanter. Formal lateral imaging and chest X-ray still to be done.
June 2016	Medical Illustrations (email)	Cost code from business manages received. First draft of hip pathway and block pro forma sent off to Medical Illustrations need to wait for the task to be allocated to designer and will send draft back for authorisation.
July 2016	Medical Illustrations (email)	Chased up as not heard. Medical illustrations have staff shortages sickness and A/L - will chase up.
July 2016	Medical Illustrations (email)	First draft received- wording changed and sent back to be adjusted.
August 2016	ED Nursing Link	senior Staff Nurse brought onto the team to help implement pathway.
	Medical Illustrations (email)	Version 2 seen-adjustments still needed. Suggested by
August 2016	Email senior Nursing Team	Band 6 and 7's emailed with new pathway to suggest any changes to wording or spot any problems. No immediate problems seen
August 2016	Email ED radiographers	Emailed and to look at the new pathway. Pointed out a wording change instead of "Shoot through" to AP Pelvis. Also wanted to clarify once department images (lateral hip and chest) done where does the patient wait. Clarified patient still under ED care and should be waiting in main ED not radiology waiting area. thanked for pointing this out. Emailed medical illustration to make changes.
August 2016	Medical Illustrations (email)	Version 3 seen- sent back with suggestion and alterations from ED radiology team.
September 2016	Moves trusts (email)	rotated to trust for ST5 year.
September 2016	Medical Illustrations (email)	Version 4 reviewed -formatting issues needed to be addressed, sent back to be addressed.

Date	Event	Summary of Minutes/Comments
October 2016	Medical Illustrations (email)	Version 5 completed
October 2016	Hip fracture governance meeting	Showed Version 5 of pathway to members of the meeting. Hip fragility nurse specialist sectors are suggested she could meet and greet NOF patients in ED - currently only works 8am - 4pm. Agrees man and bleep to be added to bottom of pathway. Raised the possibility of her providing blocks and taking referrals - not happy to do this so still need to still ring Orthopaedic junior for referrals. Not happy to do blocks as has more of an administrative role.
November 2016	Medical Illustrations (email)	emailed to add details to bottom of pathway.
November 2016	Medical Illustrations (email)	Version 6 completed
November 2016	Radiology meeting	Radiology happy to provide mobile X-ray providing it benefits the patient. And the have drawn up their own internal SOP to ensure good quality images and that duplication of X-ray requests does not Occur. It will be labelled on PACS as NOF protocol. Everyone had a walk round the ED to look at potential places to perform a mobile AP pelvis. Resus had adequate lead shielding. HDU cubical 22 had been allocated the mobile NOF cubical. stated it has good lead shielding so cannot see a problem but would like to come back and ensure it has adequate protection.
December 2016	Radiation safety officer email	<ul><li>confirmed HDU cubical 22 is safe for mobile AP Pelvis providing there can be a safe 2 metre zone from the general public.</li><li>2 Metre zone identified and is far enough from a seated waiting area.</li></ul>
December 2016	Email to and from acting Clinical Director	happy with pathway and wants it presenting to Clinical Governance meeting. Happy to do this - meeting arranged for January 2017
January 2017	Emailed YAS Clinical Director	made aware of new NOF pathway and will let all West Yorkshire stations know about pre-alerting a potential NOF so cubical 22 can be made free. A saked if YAS can do anything else. Thanked him for his offer YAS crews to follow their own SOP for analgesia.
January 2017	Clinical Governance Meeting	Pathway reviewed. ED pharmacist suggested suggested changing the wordings of some of the drugs - agreed to change not other issues identified. Team to be briefed about new pathway in ED forum.
January 2017	Medical Illustrations (email)	Asked for changes as per to be made.

Date	Event	Summary of Minutes/Comments
January 2017	Block Equipment	Medical and ANP concerned that there was a lot of running around to find equipment to perform FICB. Created a "Block Box" with all equipment inside. Added to nursing stocking log to ensure it remains full. D/W ED pharmacist about keeping LA in the box - happy providing it is kept in an area that patients can't access. Drug room in main area ideal as needs swipe access.
January 2017	Medical Illustrations (email)	Version 7 completed - signed off and sent to print.
January 2017	ED Forum	New pathway presented. Radiology team also present to answer any questions
January 2017	preparing for launch	New pathway emailed out to all clinical staff. Poster in staff and Hand over rooms. Also placed on Department Electronic log, CEM Books and social media. Nursing staff briefed by ED link nurse
2nd Febuary 2017	Launch Day	given study leave from to ensure no complication with launch day
End of Feb	communication from senior nursing tier and radiology	Email from Band 7 several patients not been sent for lateral films. Suggest that all events are recored as adverse events (Datix) copy and and the in. Continue Nurse education
April 2017	End of 3 month pilot	<ul> <li>16 Datix forms received, 15 from radiology due to missed lateral and chest X-ray although had tailed off towards the end. One from Orthopaedic about inappropriate patient on pathway sent to ward who needed HDU level care. Investigated and put as near miss.</li> <li>Discussion with formation and for about pathway added in bold disclaimer at bottom of pathway about sending patient for departmental lateral and chest film.</li> <li>Also added in a NEWS cut off if a score greater then 2 to be discussed with ST4 + about suitability for fast track pathway. Similar cut off is used for GP letters when being directed to speciality and was deemed a good safety net.</li> <li>Also to discuss with Charge Nurse for an add warning noticed to NOF when they are TCI to remind about departmental films.</li> </ul>
May 2017	Emailed TA	About changes on Symphony system re: reminding nursing staff about lateral and chest films. Agrees he can do this
May 2017	Emailed ED Business manger	To obtain new cost code to change pathway. Agreed and approved this.
May 2017	Medical Illustrations (email)	Update pathway with NEWS and warning box
May 2017	Medical Illustrations (email)	Version 8 approved
May 2017	Data interpretation	With help from ST2

Date	Event	Summary of Minutes/Comments
June 2017	Clinical Governance Meeting	<ul> <li>Presented to Clinical Governance meeting with results of trial.</li> <li>Time to X-ray down</li> <li>Time in Department down although not a huge difference as still dependant on bed availability in the hospital.</li> <li>FICB use increased</li> <li>Pain scores still poorly documented</li> <li>Pathway use increased.</li> <li>All agree it has been a positive experience, new version of pathway signed off and uploaded to CEM books. Clinical Director suggested writing project up as journal article or poster.</li> <li>To continue using pathway and revaluate in 6 months - 1 year. still away from at this time and now in FRCEM exam mode.</li> </ul>
July 2017	Orthopaedic meeting	Large MDT meeting set up to see where time can be saved to meet best practice tariff. Overall Orthopaedic team happy with pathway ward nursing team when a FICB has been used. Little else ED team can offer in terms of speeding up process.
September 2017	Moves trusts	Moved back to
October 2017	Starting QIP write up	Still have FRCEM OSCE in November so will submit in December 2017.

### Appendix 2: Radiology Standard operating Procedure for new Hip

Fracture Pathway.



#### Appendix 3: The New NOF Pathway



I Confirmed NOF fracture I Ceft I Right I I I High pain score despite IV analgesia	Patient details sticker
Block insertion will not cause untimely delay in ward tra	nsfer
Contraindications to block	
If <b>ANY</b> of these are present, the patient should not receive	e a block in the ED
Open fracture	
Known allergy to Local Anasthetic agents	
Patient refusal/inability to give consent	
Poor patient compliance     Infected injection site	
<ul> <li>Patient on Anticoagulation (excluding antiplatele</li> </ul>	its).
<ul> <li>b. Vascular injection of Local Anasthetic</li> <li>c. Permanent nerve damage</li> <li>Operator aware of Local Anasthetic toxicity signs</li> <li>Ultrasound guided or landmark technique</li> <li>Aseptic procedure: gloves/USS probe cover/lubricar</li> <li>Area Cleaned with ChloraPrep</li> <li>Maximum 40 mL of Bupivacaine 0.25% (max = 2mg</li> <li>Dose administered</li> <li>THIS IS NOT A PRESCRIPTION</li> <li>Bupivacaine</li> <li>0.25%</li> </ul>	& Location of Intralipid confirmed at Location of Intralipid confirmed at Location of Intralipid confirmed at the place immediated before inserting the block needle block needle at the place immediated before inserting the block needle at the place immediated block needle at the place immediated at the place imme
□ Aspirate prior to injection of local anaesthetic	
$\square$ Slow infiltration of the full volume of Local Anasth	netic
Cover injection site with sterile dressing	
File block documentation in the patient's notes.	
Observe 30 mins in the ED following injection	
□ Any complications observed? Y □ N □ (if	f <b>YES</b> document below)

1

# Appendix 4: - NOF Pathway updated after Adverse events

Emergency D	epartme	ent Ne	ck of	f Fen	nur F	Path	way	
							Patient details sticker	
Yes to	o all questions	Over 60 ye	ears old		Yes 🗆	No 🗆	No to one or more questions	
		Simple trip	o or fall		Yes 🗆	No 🗆		
+		isolated hi	ip pain R	or L	Yes 🗆	No 🗆	+	
Nurse initiated pathway							Reviewed by ED Senior (ST4+)	
Name:			Clinic	al conc	erns		Still suitable for pathway Yes I	No 🗆
Dignature:							ED Senior name:	
Gown and jewellery remov	red	← – –					•	
NEWS score:		· .	NEV	NS Score :	> 3		·	
IV Cannula		(gr	eater or e if suital	equal to) ble for pa	or if uns thway	ure	Signature:	
FBC     EC     COAG (INR if on w     G&S	varfarin)							
ECG     Pain Score and Analgesia     Mobile AP pelvis in Resus o     Or phone X-Ray to book a Radiology	or HDU22. y departmental						Not suitable for pathway	
ECG     Pain Score and Analgesia     Mobile AP pelvis in Resus o     Or phone X-Ray to book a Radiology     for full Hip Series if unable to perfor     Phone X-ray	or HDU22. y departmental rm mobile imaging						Not suitable for pathway Full assessment by ED m	edical
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Between 8am - 4pm Monday to Friday contact the hip fragility clinical nurse specialist once # NOF confirmed • Bleep 2684 • Ext 27334