

Case Study – Ultrasound Guided Anterior Hip Joint Injection.

Introduction

This case study will be reviewing the role of anterior hip joint injection within the management of osteoarthritis (OA) of the hip joint. To do this, the case will be described, other pathways in management of OA in the hip will be reviewed and the risks and benefits of ultrasound guided joint injections will be discussed.

The patient

The patient was referred for an ultrasound guided anterior hip joint injection in an NHS hospital setting. The patient will not be identified but is an 87-year-old female who was referred to the imaging department for a hip injection due to severe pain and reduced mobility. She was referred by the orthopaedic consultant who felt an injection may help with the lady's pain levels. The patient had very reduced mobility and needed a wheelchair to get around and was for the most part housebound.

The patient had a history OA in multiple joints and had spinal surgery with a fusion of her spine with metal rods fitted. She also had a history of type II diabetes and high blood pressure. She had previously had an injection of steroid in her knee done within orthopaedic clinic as an unguided procedure, she reported that it had been very painful but had worked well and improved her pain levels from her knee.

Diagnosis

The patient had an x-ray of the pelvis and right lateral hip which showed a severely reduced joint space in keeping with the diagnosis of OA. OA is a common disease that causes disability, but no treatment is available to prevent or slow the disease process currently, therefore, management of the symptoms is important (Mezhov et al, 2021).

OA which causes pain and alters gait is a large contributing factor in frequent falls and poor balance in the elderly population so treating this is important in improving quality of life and reducing the risk of falls (Yanardag et al, 2021).

As this patient also has a history of spinal surgery, a differential diagnosis of referred pain from the spine could be considered. With the evidence of a degenerative hip from the x-ray, OA of the hip was likely to be her main source of pain in her hip although her immobility is likely to be a combination of factors.

This was the patients first visit to the ultrasound department for her hip pain, so a diagnostic assessment of her anterior hip was undertaken. Due to the patient's mobility issues a more thorough investigation of the lateral, posterior and medial hip joints were not done as the patient was unable to adjust her position on the couch.

The Ultrasound was performed using a high frequency, linear probe with the patient in a semi-recumbent position. The femoral head was located and used as a landmark to obtain a sagittal-oblique view of the anterior hip joint to assess the anterior hip joint and synovial recess and iliopsoas complex and bursa. (Jacobson, 2018), (Molini et al, 2011). The patient was found to have an anterior joint effusion and degenerative appearance of the anterior hip joint.



X-ray of the pelvis

Injection

Due to the findings of an anterior hip joint effusion during the scan it was decided that an aspiration of the fluid would be done prior to the injection.

The procedure was explained to the patient and verbal consent was gained in line with trust policy. The patient was asked if she had any allergies, what medications she was taking, if she had a previous drug reaction, if she had had a covid vaccine recently and if she was diabetic and how was it controlled. The patient agreed that she was happy to go ahead with the aspiration and injection.

An aseptic technique was used to reduce the risk of infection. The patient's skin was cleaned with chlorhexidine solution and the probe was covered with a sterile probe cover. Sterile gloves were worn. It is important to minimise the risk of infection as an infection in the joint can have severe consequences for the patient although, the risk is thought to be low during a joint injection. A retrospective study over 10 years of septic arthritis cases by Weston et al (1999) showed only 3 cases of septic arthritis that could be related to steroid injection over the 10-year period. This appears low but this is an old study and the numbers of joint injections carried out now in comparison to the study dates has increased rapidly.

The patient was given a local anaesthetic injection of 5mls of 1% lidocaine to make the procedure more comfortable. While the local anaesthetic took effect the steroid injection was drawn up of 80mg of Depomedrone mixed with 3mls of 0.5% Chirocaine (levobupivacaine). The Chirocaine is a long-acting aesthetic, this was given with a view to giving the patient some immediate relief from their symptoms which may assist in them getting home in more comfort. It also can be useful when assessing how well the injection has worked for the patient when considering a second injection, if the patient has immediate relief but the symptoms can back quickly with no further relief it is more reassuring that the injection was administered correctly but the steroid was not helpful. Therefore, this can help decide the next course of management.

This injection was being done under a patient specific directive with the direct supervision of the medical prescriber, in this case the radiologist. Once training in MSK injections is completed a patient group directive will be used and therefore the drugs will not be able to be mixed in the syringe and if both are required will need to be given in two separate syringes in accordance with the scope of practice. (NICE, 2013), (BMA, 2016).

A 22g spinal needle was used for the injection due to the depth needed, the spinal needle is finer and more difficult to identify on ultrasound so careful attention is needed while inserting it to ensure the correct position, looking for tissue movement rather than a clear image of the needle. It is particularly important during a hip injection to ensure correct path of the needle due the location of the femoral vessels which it is essential are avoided. The needle is inserted using an anterolateral approach towards the femoral head, thus avoiding important structures. (Resteghini, 2018).

Approximately 5-7 mls of straw-coloured fluid was aspirated. The benefit of doing an aspiration before the corticosteroid injection is to reduce joint hypertension which can reduce the pain quickly, therefore the patient may feel an immediate benefit of the procedure. As the patient had no signs or symptoms of an infection and the sample was as expected there was no indication for it to be analysed therefore it was discarded. (Courtney and Doherty, 2013).

The needle was kept in place and the Depomedrone, Chirocaine mix was injected under ultrasound guidance, to ensure the medication was going into the joint space. Seeing the joint capsule rise and seeing the fluid move within the capsule demonstrates the injection has been administered in the correct place.

Once the injection was complete a sterile plaster was used to cover the injection site. The patient was advised to monitor her blood sugar more closely over the next few days, and informed that there was no evidence of being more vulnerable to covid after a steroid injection but to avoid having her booster vaccine within the next two weeks as per trust guidelines.



The needle can be seen in the joint capsule

Alternative Management

A hip replacement would be an alternative to the joint injection. The NHS website states that this would be offered if the patient has such severe symptoms such as pain and reduced mobility that it reduces the patient's ability to perform everyday tasks such as shopping or getting out the bath. It also states that it is only recommended if other treatments, such as physiotherapy and steroid injections, have not been successful (NHS, 2019).

A study by Gwynne-Jones et al (2020) looked at patients referred to physiotherapy clinic for hip or knee pain and if it reduced the need for surgery. The study found after 7 years that 55.9% of knee patients and 23.7% of hip patients had not undergone surgery therefore, it would appear from this data that physiotherapy is more effective for knee pain than hip pain.

A study by Svege et al (2015) found an exercise therapy programme reduced the need of hip replacement from 75% to 59%, this study had a cohort of 109 patients. This suggests that the correct exercises can help a patient suffering hip pain but, in the case of the patient being discussed, her limited mobility reduced her ability to comply with a programme of exercise.

It should also be taken into account the lack of face-to-face contact over the 18 months prior to the patient coming for the joint injection the access to NHS services and face to face appointments has been significantly reduced due to the Covid-19 pandemic. Hospitals have made massive changes to services to enable the NHS to cope with the pandemic which has meant increased waits for non-urgent appointments (Goyal et al, 2020).

Also, when considering the patients age, she would have been shielding and therefore, may have been apprehensive to attend appointments had they been available. This may be a contributing factor in her reducing mobility.

An anatomically guided injection could be an option but within the trust guidelines this is not routinely done for hip injections when ultrasound guidance is available. A study by Fang et al (2021) on knee injections stated that up to 1 in 4 injections done without image guidance were delivered outside of the joint capsule. This suggest that a guided injection is a safer more effective approach.

To be considered for a hip replacement the patient needs to be well enough to cope with major surgery and post operative rehabilitation (NHS, 2019). The patient being discussed was very elderly and frail, frailty increases the risk of negative surgical outcome and elderly patients have a higher rate of post operative complications and mortality than younger patients (Wilson et al, 2021). This is a strong factor in the orthopaedic department referring the patient for an ultrasound guided injection instead of hip replacement despite the severe degenerative changes and pain levels experienced by the patient. The risks to the patient

from major surgery and a likely prolonged hospital stay outweigh the benefits of the procedure.

Risk Factors

There are risks to giving a corticosteroid injection which should be considered. The patient may experience steroid flare post procedure where the usual pain they experience increases for a short time. A study by Goldfarb et al (2007) found this occurred in 33% of patients. This study looked at the composition of the injection and its PH to see if that made a difference in patient experience but both groups (acidic and neutral injections) had a similar rate of steroid flare.

Poorly controlled diabetes is a risk factor when considering a corticosteroid joint injection. Studies have shown a corticosteroid injection into a joint can cause a temporary imbalance in blood sugar levels. The patient should be made aware of this so they can manage it effectively (Latourte and Lellouche, 2021). The patient discussed in this case had well managed diabetes but was advised to be aware her sugars may fluctuate following the injection.

Drug reactions are always something that must be considered when giving any medication therefore, it is important to always ask the patient about any previous drug reactions or allergies. The local anaesthetic given before the joint injection is the most likely culprit in a drug reaction in the case discussed. It is important to look out for drug reactions as the quicker the symptoms are recognised and acted on the better the outcome for the patient. Local anaesthetic systemic toxicity (LAST) is important to be aware of, it is more likely when the local anaesthetic has been mistakenly injected into the blood stream therefore, drawing back the syringe to ensure no blood flows into it before injecting will help prevent this (Mahajan and Derian, 2021).

Local anaesthetic into intra-articular joints have been shown to have a risk of cartilage toxicity and cause chondrolysis. A study by Gulihar et al (2015) concluded that infusions of local anaesthetic into a joint is high risk but with a single injection, as in this case, there is little evidence of risk of chondrolysis but it sensible to keep doses low. In this case the injection contained 2ml of chirocaine 0.5% therefore, a low dose.

Septic arthritis is a rare complication of joint infection, a study reviewed by (Latourte and Lellouche, 2021) found that the risk of septic arthritis when using a sterile syringe was 1 in 162000 and 1 in 21000 when the syringe was not known to be sterile. This would indicate that it is important to document the technique used for the injection and ensure the medical notes reflect that the conditions of the injection were appropriate and within guidelines.

A rare side effect of a steroid joint injection was discussed by Tiwari et al (2018) of rapid joint destruction after intra-articular corticosteroid injection. Within two months of having a hip injection the patient suffered rapid destruction of the hip joint which resulted in a need for a total hip replacement. The patient had no signs in the blood or from analysis of the joint aspiration of any septic changes to suggest a septic arthritis. Having reviewed the patient's risk factors it was concluded that the steroid injection was likely to be the cause of the rapid destruction of the patient's hip due to chondrolysis but within the article there was no conclusive data of a single steroid injection having produced this effect previously and the study did suggest that more research was needed to look at cartilage damage from intra-articular steroid injections.

Benefits of Ultrasound Guided Injection

The benefits of this procedure for the patient include that it is a quick procedure with a fast recovery time. It is a minimally invasive procedure with no surgery, general anaesthetic or hospital stay is required. COVID-19 has made hospital stays riskier particularly for the elderly. With adequate PPE for both the clinician and the patient a joint injection procedure carries far less risk of COVID-19 transmission than a hospital admission due to the reduced contact time. (Goval et al, 2020).

If the injection gives the patient relief from the pain the procedure is easily repeatable for ongoing symptom management.

Ultrasound guided joint injections are becoming increasingly popular as a way of managing musculoskeletal problems due to them being cost effectiveness when compared to a surgical approach. The accuracy of the injection using ultrasound guidance is shown in a study by Fang et al (2021) to be higher in all studies reviewed than anatomically guided injections. Ultrasound guided injections had an accuracy of greater than 95% while anatomically guided injections had an accuracy between 77.3 and 95.7%. The accuracy in

the anatomically guided injections was heavily influenced by the experience of the person doing the injection whereas the ultrasound guided injection showed no significant difference with level of experience.

Conclusion

Having reviewed the patient's condition, a ultrasound guided joint injection was the best option for the patient given her circumstances. She was very immobile so would have been unable to comply with exercises given by the physiotherapy department without significant support. The NHS would struggle to provide that level of support even in pre COVID times but with a pandemic the NHS resource were stretched further.

The patient was not a good candidate for surgery given her age, immobility and frailty so a surgical approach would have likely not been a good option for her due to the risks of general anaesthesia, a prolonged hospital stay and the COVID risks associated with a hospital stay.

Unfortunately, two weeks after the hip injection the patient suffered a fall and sustained a hip injury, x-ray and CT scans did not reveal a fracture, but the patient needed a hospital stay to get her pain under control. This meant a review of the outcome of her injection was not done so its effectiveness cannot be commented on.

References

BMA. (2016). 'Patient Group Directions and Patient Specific Directions in General Practice'. BMA Policy Directorate. <https://bma.org.uk/media/1592/bma-patient-group-and-patient-specific-direction-jan-2016.pdf> accessed 29/10/2021.

Courtney, P. and Doherty, M. (2013). 'Joint Aspiration and Injection and Synovial Fluid Analysis'. *Best Practice and Research Clinical Rheumatology*, 27 (2): 137-169.

Fang, W.H., Xiao, M.S., Chen, T. and Vangsness, T. (2021). 'Ultrasound-Guided Knee Injections are more Accurate than Blind Injections: A Systematic Review of Randomized Controlled Trials. *Arthroscopy, Sports Medicine and Rehabilitation*, 3(4):e1177-e1187.

Goldfarb, C. A., Gelberman, R. H., Mckeon, K.m Chia, B. and Boyer, M. I. (2007). 'Extra-Articular Steroid Injection: Early Patient Response and the Incident of Flare Reaction'. *The Journal of Hand Surgery*, 32 (10): 1513-1520.

Goyal, N., Ghonge, N.P. and Vaish, A. (2020). 'Optimal Utilization of MSK Imaging during COVID-19 Pandemic'. *Journal of Clinical Orthopaedics and Trauma*, 11(supp4): s428-s430.

Gulihar, A., Robati, S. and Taylor, G. J. S. (2015). 'Articular Cartilage and Local Anaesthetic: A Systematic Review of the Current Literature'. *Journal of Orthopaedics*, 12(Suppl 2): s200-s210.

Gwynne-Jones, J.H., Wilson, R.A., Wong, J.M.y., Haxby Abbott, J. and Gwynne-Jones, D.P. (2020). 'The Outcomes of Nonoperative Management of Patients with Hip and Knee Osteoarthritis Triaged to a Physiotherapy Led Clinic at Minimum 5-year Follow-Up and Factors Associated with Progression to Surgery'. *The Journal of Arthroplasty*, 35 (6):1497-1503.

Jacobson, J. A., (2018). *Fundamentals of Musculoskeletal Ultrasound*, 3rd Edn. Philadelphia: Elsevier.

Latoure, A. and Lallouche, H. (2021). 'Update on Corticosteroid, Hyaluronic Acid and Platelet-Rich Plasma Injections in the Management of Osteoarthritis'. *Joint Bone Spine*, 88 (6): 105204.

Mahajan, A and Derian, A. (2021). 'Local anesthetic Toxicity'.
<https://www.ncbi.nlm.nih.gov/books/NBK499964/> Accessed 03/11/21.

Mezhov, V., Laslett, L.L., Ahedi, H., Blizzard, C.L., Aspden, R.M., Gregory, J.S., Saunders, F.R., Munugoda, I.P., Cai, G., Cicuttini, F., Graves, S.E., Lorimer, M. and Jones, G. (2021). 'Predictors of Total Hip Replacement in Community Based Older Adults: A Cohort Study'. *Osteoarthritis and Cartilage*, 29 (8): 1130-1137.

Molini, L., Precerutti, M., Gervasio, A., Draghi, F. and Bianchi, S. (2011). 'Hip: Anatomy and US Technique', *Journal of Ultrasound*, 14: 99-108.

National Institute for Health and care Excellence. (2017). 'Patient group directions Medicines practice guidelines. <https://www.nice.org.uk/guidance/mpg2> Accessed 29/10/21

NHS. (2019). 'Overview Hip Replacement'. <https://www.nhs.uk/conditions/hip-replacement/> Accessed 03/11/21.

Resteghini, P. (2018). *Ultrasound Guided Musculoskeletal Injections of the Lower Limb*. www.mskus.co.uk.

Svege, I., Nordsletten, L., Fernandez, L. and Risberg, M.A. (2015). 'Exercise Therapy May Postpone Total Hip Replacement Surgery in Patients with Hip Osteoarthritis: A Long-Term Followup Of a Randomised Trial'. *Ann Rheum Dis*, 74: 164-169.

Tiwari, A., Karkhur, Y., Keeney, J. A. and Aggarwal, A. (2018). 'Rapid Destructive Osteoarthritis of the Hip after Intra-articular Steroid Injection'. *Arthroplasty Today*, 4 (2): 184-186.

Weston, V.C., Jones, N., Bradbury, N., Fawthrop, F. and Doherty, M. (1999). 'Clinical Features and Outcomes of Septic Arthritis in a Single UK Health District'. *Annals of Rheumatic Disease*, 58:214-219.

Wilson, S., Sutherland, E., Razak, A., O'Brien, M., Ding, C., Nguyen, T., Rosenkranz, P. and Sanchez, S. (2021). 'Implementation of a Frailty Assessment and Targeted Care interventions and its Association with Reduced Postoperative Complications in Elderly Surgical Patients'. *Journal of American College of Surgeons*.

<https://doi.org/10.1016/j.jamcollsurg.2021.08.677> Accessed 03/11/21.

Yanardag, M., Tarsuslu Simsek, T. and Yanardag, F. (2021). 'Exploring the Relationship of Pain, Balance, Gait Function, and Quality of Life in Older Adults with Hip and Knee Pain', *Pain Management Nursing*. 22 (4): 503-508.