Acute Radicular Pain Pathway – A service evaluation of the acute radicular pain pathway in the University Hospital of Wales

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Many thanks to Mr Robert Goldsmith for his kind help and guidance during this project.

Abstract

Objective: To assess the new acute radicular pain pathway (ARPP) in The University Hospital of Wales from the beginning of 2023 to the present to find areas for improvement with a specific focus on the time it takes for patients to receive fast-track imaging, epidural injections, and surgical opinion.

Method: Retrospective analysis of the data from the new ARPP. Data was collected using an online Microsoft form available to clinicians to refer patients to the ARPP. Additional information was added using Welsh Clinical Portal, Synapse and relevant medical notes. Microsoft Excel was used for data analysis.

Results: 95 patients were studied for this service evaluation. 68 (72%) patients were referred for fast-track imaging and 27 (28%) patients were referred for nerve root block. The median time from the date of referral to the date of the MRI appointment was 31 days. The median time from the date of referral to the date of NRB was 41 days.

Conclusion: The result of this study shows that whilst there are differences in care for each patient, the time it takes for patients to access MRI and NRB using the new ARPP is less than the old pathway.

Introduction

Healthcare professionals (HCP) encounter many patients presenting with back pain. One of the most common causes is radicular back pain[1]. Radicular pain is described as pain caused by a disease process where the dorsal nerve root or the dorsal root ganglia is affected causing symptoms[2]. Radicular pain can be caused by irritation of nerve roots anywhere along the spinal cord however the most susceptible area is the L5 region[1].
Considering this, the focus of this article will be lumbar radiculopathy (LR) (also known as sciatica) rather than cervical radiculopathy.
The prevalence of LR fluctuates between different studies however it is estimated that around 13–40% of the population will develop this condition at some point in their life[3].

The typical symptoms of LR are radiating unilateral leg pain that is described as sharp, throbbing or burning in nature, lower back pain, paraesthesia in the distribution of the affected nerve root, weakness and loss of motor function[3].
The diagnosis of LR is mainly clinical. It is important to note that there are variations in the anatomical distribution of radicular pain within individuals[4].
The two most common causes of LR are a herniated vertebral disc and spinal stenosis causing nerve root compression[1].
The pathophysiology of radicular pain is complex and poorly understood. It has been shown that LR involves different types of pain such as mechanical, ischaemic, inflammatory and neuropathic[2] (Figure 1).
When a noxious stimulus like a herniated disc is present at the dorsal nerve root for an extended period it alters the neural

system resulting in persistent pain even after removal of the stimulus[5].
Radicular back pain can significantly affect individuals' ability to work which in turn has social, economic and psychological impacts.
The National Institute for Health and Care Excellence (NICE) has a summary on managing adult patients with back pain and sciatica (Figure 2)[6]. It is important to check for red flag symptoms and rule out serious pathologies first (Table 1). 85% of patients with radicular pain improve at 6 weeks after initial presentation [4] therefore it is vital to optimise the conservative management of sciatica in the first instance[7]. More invasive options include epidural injections and surgical intervention. HCPs need to understand the role of an MDT approach in the management of patients with radicular pain[8].
The evidence for epidural corticosteroid injections is not well demonstrated. Some studies have shown epidural injections offer short-term relief of radicular pain. Whereas other studies show no difference in the effect of corticosteroid injection compared to placebo[9]. Patients with prolonged LR have poorer outcomes after surgery [10].
Both invasive interventions can improve patient quality of life, however, there are multiple barriers to patients accessing these treatments promptly.
The routine pathway in the University Hospital of Wales (UHW) was poorly coordinated leaving patients in significant amount of pain. This led to the introduction of a new acute radicular pain pathway (ARPP) in 2020 with a more patient-centred and well-coordinated approach.
The new ARPP applies to patients with acute radiculopathy of the arm or leg with no improvement after 6 weeks.
Conservative management must be tried first before patients enter this pathway and the pain must severely affect their function and mental well-being. If patients meet the criteria (Table 2) to be entered into the pathway, they will be referred for fast-track imaging and/or injection list based on their requirements.
The new pathway involves input from physiotherapists, radiologists, and spinal surgeons. After receiving fast-track imaging and/or epidural injection, patients requiring further surgical intervention and/or opinion will be discussed at a weekly virtual MDT with the spinal surgeons present.
This study aims to assess the new ARPP in 2023 in UHW to find areas for improvement with a specific focus on the time it takes for patients to receive fast-track imaging, epidural injections, and surgical opinion.

Method

The data required for this study was collected by Mr Robert Goldsmith, clinical lead physiotherapist, from the introduction of the ARPP within UHW. The focus of this project is the data collected from the beginning of 2023 until 23/6/2023. All patients that have been referred to the ARPP pathway in 2023 have been selected regardless of their age or gender. For each person, data was collected using an online Microsoft form available to clinicians to refer patients to the ARPP which was then converted to an Excel sheet. Additional information such as the status of the patient within the pathway, date of Magnetic Resonance Imaging (MRI) and date of epidural injection (nerve root block (NRB)) was added to the sheet using Welsh Clinical Portal, Synapse and relevant medical notes.
All the data needed for this study was collected as a part of routine clinical care therefore this project is considered a service evaluation and did not require ethical approval.

The information collected was treated as highly confidential and was always kept in the hospital in a password protected file. Analysis of the results was performed using Microsoft Excel version 16.74.

Results

Overall, 95 patients were referred to the new ARPP from 1/1/2023 until 23/6/2023. 41 (43%) patients presented with pain on the right side and 54 (57%) presented with pain on the left side (Figure 3). 43 (45%) patients were clinically diagnosed to have L5 radiculopathy which was the most common level affected among the population of the study. The second most common level affected was S1 with 25 (26%) patients being diagnosed (Figure 4). The pain score upon referral was recorded for all patients out of 10, with a median of 8. All the patients scored above 6 to be entered into the pathway.

Clinicians can refer patients directly for fast-track imaging or NRB. 68 (72%) individuals were referred for MRI and 27 (28%) were referred for NRB.

During this time patient's status within the pathway was regularly updated. At the end of the data collection period (23/6/2023) 21 (22%) patients were awaiting MRI, 18 (19%) patients have received MRI and were awaiting follow up,11 (12%) patients did not have NRB performed, 11 (12%) patients received both NRB and follow up appointment, 9 (10%) patients were awaiting NRB, 8 (8%) patients received NRB and were awaiting follow up, 8 (8%) patients completed MRI and were awaiting follow up, 4 (4%) patients did not attend their radiology appointment, 3 (3%) patients did not attend their physiotherapy follow up, 2 (2%) patients were referred for surgical opinion (Table 3).

The median time from the date of referral to the date of the MRI appointment was 31 days (range: 4 - 179 days) (Figure 5). The median time from the date of referral to the date of NRB was 41 days (range: 13 – 64 days) (Figure 6).

Discussion

Patients who were referred using the old pathway would wait around 6 months to 2 years to receive MRI and NRB. The result of this study reflects that whilst there is variability in care for each individual, the time it takes for patients to access MRI and NRB using the new ARPP is significantly less than the old pathway.

Although this result is favorable there is still room for improvement. There were multiple reasons found for delays along the new ARPP.

One of the reasons for delays was missed appointments. There were several instances where patients did not or could not attend either their radiology or follow up appointments. Most of the patients were rebooked based on appointment availability.

The new ARPP was introduced in 2020 and as a result, some clinicians are not very familiar with this pathway and how referrals should be made. This causes some eligible patients to still be referred via the old pathway or some referrals get lost which in turn causes significant delays.

There is also a role for human factors in this. There were multiple cases that the details such as patient identifier numbers were incorrectly entered onto the referral form. This needs to be corrected manually at the moment which can take time.

To make improvements within the new ARPP it is vital to consider the role of education. All relevant clinicians must be made aware of this pathway and have guidance on the referral process. This can significantly improve the time it takes for patients to receive MRI or NRB.

Another area to consider for improvements is appointment availability. It can be difficult at times to find early available appointments for MRI and NRB. By

investing in new machines for the radiology department and increasing the number of skilled staff there can be a reduction in patient waiting times and overall better outcomes.
There is one significant limitation that can be identified in this study. The sample size of this study is small and only 95 patients were selected. This means that the results of this study cannot be applied to the wider population and is not an accurate representation of how the new ARPP is improving patient experience and outcomes.
This project can be further expanded by using a larger study population over a longer period.

Conclusion

This service evaluation was conducted to assess the new ARPP in 2023 in UHW.
The main focus of this study was on the time it takes for patients to receive fast-track imaging, epidural injections, and surgical opinion.
The results demonstrate that patients referred through the new ARPP received MRI with a median time of 31 days and received NRB with a median time of 41 days.
The sample size of 95 patients is not sufficient to consider this study to be representative of how the new ARPP is performing within UHW.
Despite the limitations of this service evaluation, this study can be utilized as a blueprint of how to collect data and recognize points for optimization of the new ARPP.
This project can be further developed using a larger study population over a longer period to get a more precise picture of the impact of the new ARPP on patient care.

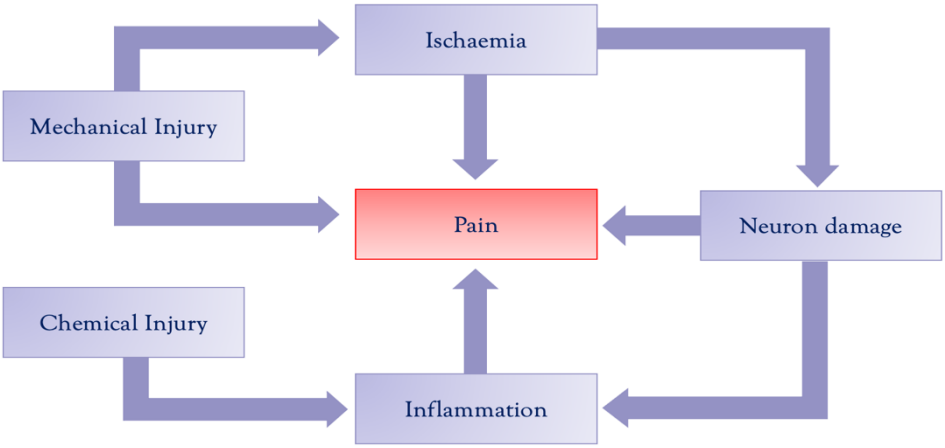

Figure 1. Diagram demonstrating the pain mechanism in LR [2]

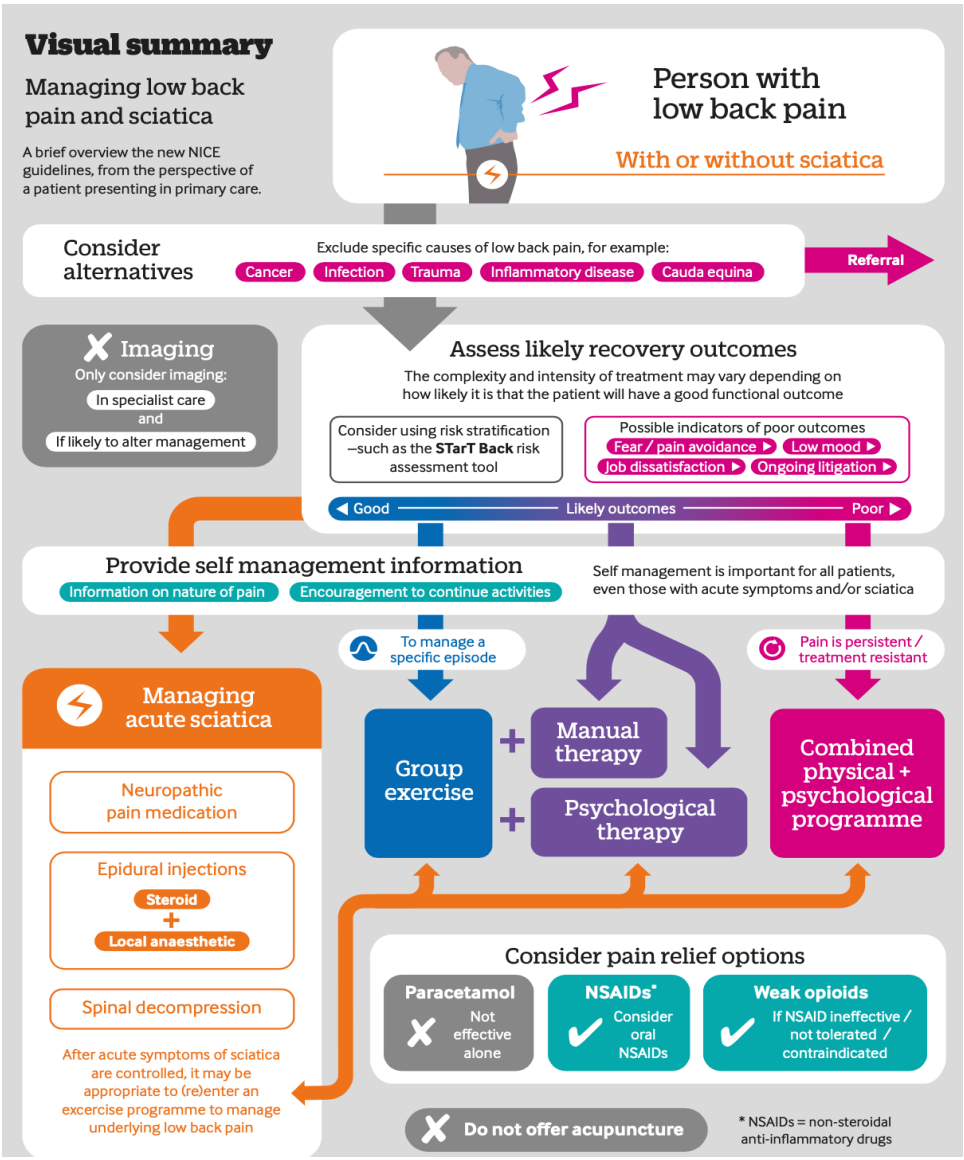

Figure 2. A visual summary of the NICE guidelines on managing back pain and sciatica [6]

The required criteria for patients to be referred to ARPP
Acute pain showing no or little improvement at 6 weeks
Pain in leg or arm remains severe > 7/10
Pain is severely affecting function and mental well being
Patient wishes to consider further intervention
If considering injection; Does the MRI correlate

Table 1. Table of the required criteria for patients being referred to the ARPP.

Examples of some of the red flags for back pain
Bowel or bladder dysfunction
Progrresive neurological weakness
Saddle anaesthesia
Bilateral Radiculopathy
Unrelenting night pain

Table 2. Table of red flags for back pain

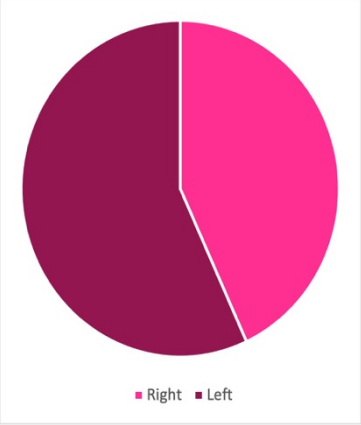

Figure 3. Pie chart demonstrating the distribution of patients with right radiculopathy compared to left radiculopathy.

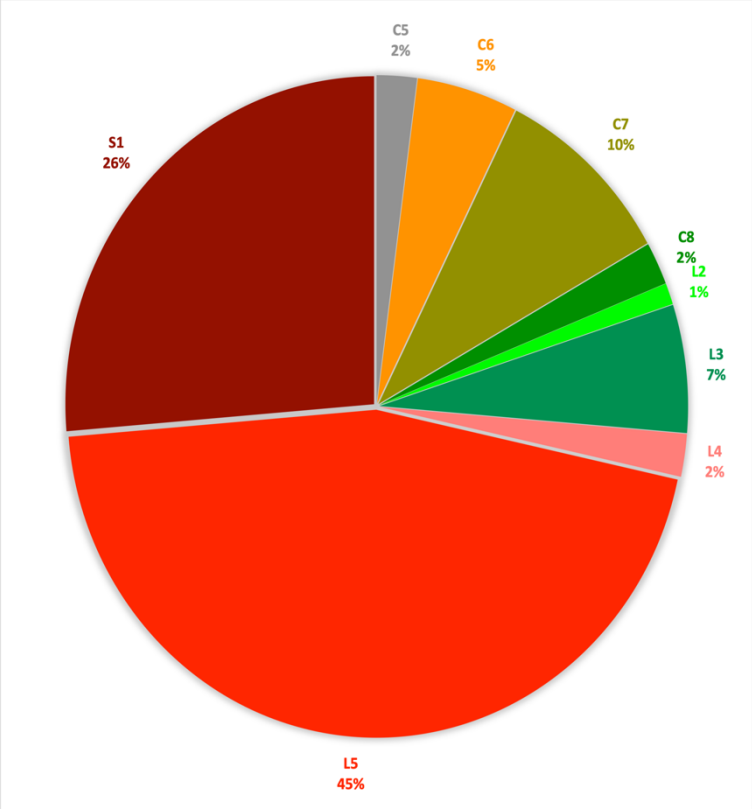

Figure 4. Pie chart demonstrating the percentage of patients diagnosed with each level of radiculopathy.

Status	Number of patients
Awaiting MRI	21
Recieved MRI and FU	18
NRB not performed	11
Recieved NRB and FU	11
Awaiting NRB	9
NRB completed, awaits FU	8
MRI completed, awaits FU	8
DNA Radiology	4
DNA Physio FU	3
Referred to Surgeon	2
Grand Total	**95**

Table3. Table demonstrating the number of patients in each state of the pathway. In the table FU stands for Follow Up and DNA stands for Did Not Attend

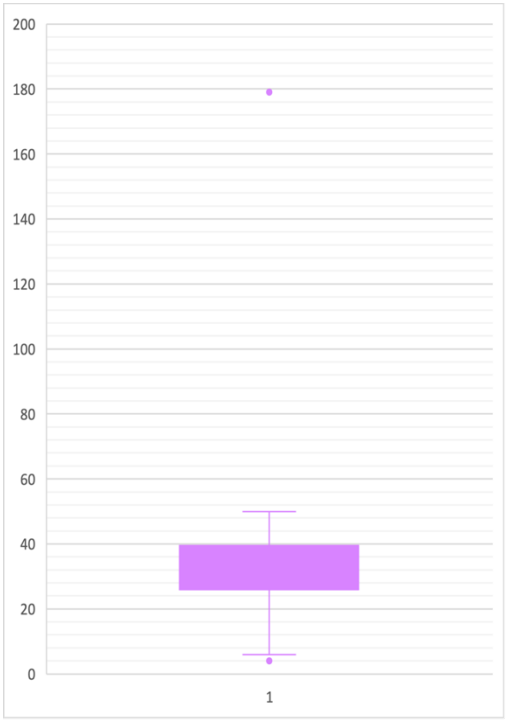

Figure 5. Box and whisker diagram demonstrating the median and range of the time from initial referral to receiving MRI.

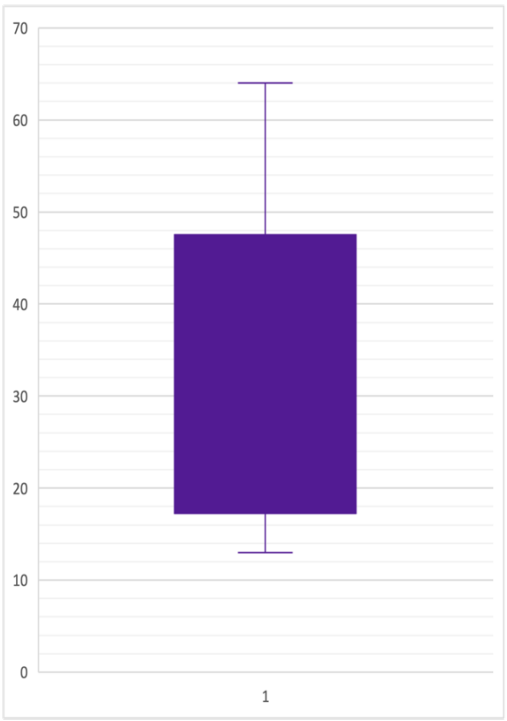

Figure 6. Box and whisker diagram demonstrating the median and range of the time from initial referral to receiving NRB.

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