An Audit of Elective Outpatient Spinal Surgery Referrals

Abstract

Objectives
To investigate baseline demographic information on: who was referring, diagnosis, waiting interval interventions, and management plan by a spinal surgeon, whilst on the outpatient waiting list.

Methods
Two hundred ten new consecutive referrals were identified following attending clinic with a single spinal surgeon over an outpatient clinic from May 2016 to May 2017. Investigation of the patients' medical notes was necessary. PROMS data was also measured (ODI, VAS, EQ5D, PHQ9, GAD7). The initial number of patients was 270, however 60 notes were unobtainable.

Results
We found that of the 210 patients who presented to the spinal surgeon's clinic, only 13% proceeded to undergo spinal surgery whilst 24% were managed with physiotherapy following the appointment. General practitioners were the referring body with the highest percentage of patients (29%) who were managed conservatively following clinic with the spinal surgeon. Twenty-two percent of referrals from extended scope spinal physiotherapists continued to be managed conservatively by the surgeon. A quarter of patients had physiotherapy during the waiting time. This was seen to be beneficial as only 7% of this cohort went on to have surgery. Spinal injections were the most common management plan (41%). There were no significant findings between the referring bodies and the PROMS.

Conclusions
A quarter of referrals to a spinal surgeon were managed conservatively without any direct spinal surgeon intervention procedures (i.e. injection or surgery). General Practitioners are the referring body with the highest percentage of patients managed conservatively. Physiotherapy during the waiting time is implemented in 1 in 5 patients. To address these findings: The Welsh Patient Referral Service, criteria to enter triage, and a more efficient use of the physiotherapy outpatient department. This may occur secondary to the new NICE guidance on low back pain and sciatica.

Introduction

Low back pain has become a major public health problem in all developed countries and is a leading cause of disability in adults of working age.[1,2] The lifetime prevalence of low back pain is reported to be 80%.[1] This accounts for 7% of GP consultations and costs the National Health Service £500 million annually. [3,2] It is clear therefore that an implementation to reduce the widespread burden of low back pain is necessary.

In order to construct a therapeutic implementation to reduce this widespread burden, we must first establish any source of inefficiency. In accordance with the recent NICE guidelines (2016), patients should be referred to a spinal surgeon if they have evidence of "red flag" symptoms which suggest an increased risk of underlying systemic disease, fracture, or neurological injury,[4] or if self-management through avid physical and psychological therapy has failed. This audit aims to investigate baseline demographic information on: who was referring, diagnosis, waiting interval interventions, and management plan by a spinal surgeon, whilst on the outpatient waiting list. Following this, we will then investigate if there is an implementation to improve the referral scheme.

In our study, there is a minimum six month waiting period from the time of referral to the time the patient is seen. This lead us to question the therapies these patients are engaging during this period, and if a formal physiotherapy programme during this time would indeed improve their long term outcome.

The null hypothesis of our study: all referrals to a spinal surgeon were relevant, and that patients who underwent physiotherapy during the waiting period required further intervention.

Methods

Subjects

The patients selected for this retrospective study (n = 210, age range 22-91) presented to the clinic of a single spinal surgeon from May 2016 to May 2017. Investigation of the patients' notes were necessary for information on the following parameters: referring body, reason for referral, waiting period, treatment during waiting period, smoker, patient concerns and expectations, disability, receiving benefits, diagnosis, management plan.
The patients completed a standard PROMS questionnaire including visual analog scale (VAS) for back (10 possible points), VAS for leg (10 possible points), Oswestry Disability Index (ODI; scored in percentage),[5] EuroQol-5D (Eq-5D) VAS (self-rated health index, scored in percentage), Patient Health Questionnaire-9 (depression index, 27 possible points)[6] Generalized Anxiety Disorder-7 (anxiety index, 21 possible points)[7] and Surgical Expectation Scores.[8]

Statistical Analyses

The software SPSS23 was used for statistical analyses (IBM, Armonk, New York, United States). The demographic sample sizes of each group of referring body (GP, physiotherapist, specialist) were calculated as were the corresponding means and 95% confidence intervals. One-way analysis of variance was used to compare this to the respective PROMS.

Results

Table 1: The distribution of referrals to the spinal surgeon from the respective referring body.

Referring Body	*n*		%
GP	58		28
Physiotherapist	59		28
No referral	28		13
Specialist	64		31
		43 = Orthopaedics	67
		8 = Pain department	13
		5 = Rheumatology	8
		4 = Neurology	6
		2 = Respiratory	3
		2 = Cardiology	3

Table 2: The distribution of symptom presentation at the point of referral.

Symptoms	*n*	%
Low back pain alone	9	5
Low back pain + sciatica	98	49
Low back pain + sciatica + bladder	14	7
Sciatica alone	27	14
Neck and shoulder girdle pain	2	1
Neck pain alone	5	3
Neck pain + radiculopathy	33	17
Neck pain + radiculopathy + multi joint pain	2	1
Cervical radiculopathy	7	4
Other	3	2

Table 3: Distribution of patients with regard to maintreatment during the waiting time, from the time of referral to when the patient is seen by the spinal surgeon.

Main treatment during waiting time	*n*	%
Physiotherapy	42	20
Weak opioids	42	20
Strong opioids	17	8
Neuromodulators	39	19
Paracetamol	8	4
NSAIDS	15	7
No treatment	46	22

Table 4: Distribution of patient concerns.

Patient concerns	*n*	%
Exacerbation	23	14
Functional	37	22
Lack of information	6	4
Pain	16	9
Quality of life	20	12
Social	13	8
Surgery	11	6
No concerns	44	26

Table 5: Distribution of patient expectations

Patient expectations	*n*	*%*
Information	28	16
Symptom improvement	26	15
Functional	6	3
Pain relief	57	33
Injection	3	2
Surgery	9	5
Unsure	44	25

Table 6: Distribution of diagnoses following the appointment with the spinal surgeon.

Diagnosis	*n*	*%*
Cervical disc prolapse	12	6
Lumbar / sacral disc prolapse	34	17
Lumbar spinal stenosis	55	28
Lumbar spondylolisthesis	28	14
Degenerative disc disease	26	13
Chronic pain diagnosis	8	4
Other	26	13
Diffuse Idiopathic Skeletal Hyperostosis	2	1
Facet joint arthrosis	6	3

Table 7: Distribution of the management plan following an appointment with the spinal surgeon

Management Plan	*n*	*%*
Conservative	50	24
Injection	85	41
Surgery	28	13
Further Investigation	8	4
Referred elsewhere	33	16
Discharged	4	2

Table 7 shows that forty-six percent of patients did not receive spinal surgeon intervention (injection or surgery) as identified at the first outpatient consultation.

Table 8 compares the referring body against the respective management plan. The lowest percentage of patients requiring surgery are referred from secondary care specialists. The majority of referrals from the three referring bodies required an injection.

Table 8: The distribution of management plans for the respective referring bodies.

Referring body (%)	Management Plan (%)					
	Conservative (*n*=50)	Injection (*n*=85)	Surgery (*n*=28)	Further investigation (*n*=8)	Referred elsewhere (*n*=33)	Discharged (*n*=4)
GP (28)	29	41	14	3	10	2
Physiotherapist (28)	22	44	19	3	12	0
Specialist (31)	19	47	8	2	22	3
No Referral (13)	29	21	14	11	21	4

Table 9: The distribution of treatments during the waiting time for the respective referring bodies.

Referring body (%)	Treatment during waiting time (%)						
	Physiotherapy (*n*=42)	Weak opioids (*n*=42)	Strong opioids (*n*=17)	Neuromodulators (*n*=39)	Paracetamol (*n*=8)	NSAIDS (*n*=15)	No treatment (*n*=46)
GP (28)	26	21	7	21	5	9	12
Physiotherapist (28)	25	20	8	20	3	5	17
Specialist (31)	11	22	8	20	0	9	30
No Referral (13)	18	14	11	7	11	4	36

Table 9 is a comparison of the referring body to the treatments during the waiting time. It is noteworthy that patients who have seen a GP or physiotherapist are more likely to have physiotherapy during the waiting time.

Table 10: The distribution of management plans for the respective treatments during the waiting time.

Treatment during waiting time (%)	Management Plan (%)					
	Conservative (*n*=50)	Injection (*n*=85)	Surgery (*n*=28)	Further Investigation (*n*=8)	Referred elsewhere (*n*=33)	Discharged (*n*=4)
Physiotherapy (*20*)	40	40	7	5	5	2
Weak opioids (*20*)	21	48	12	2	17	0
Strong opioids (*8*)	6	41	18	0	35	0
Neuromodulators (19)	13	44	28	2	13	3
Paracetamol (*4*)	0	75	0	13	13	0
NSAIDS (*7*)	20	33	20	20	7	0
No treatment (*22*)	33	30	7	2	24	4

Table 10 compares the treatment during the waiting time to the different management plans. It shows that of the patients who underwent physiotherapy during the waiting time, only 7% underwent surgery. In comparison, 28% of patients taking neuromodulating drugs underwent surgery. This therefore demonstrates that physiotherapy is beneficial during the waiting time.

Table 11: The distribution of diagnoses for the respective management plans.

Management Plan (%)	Diagnosis (%)								
	Cervical prolapse (*n*=12)	Lumbar / sacral prolapse (*n*=34)	Stenosis (*n*=55)	Spondylolisthesis (*n*=28)	DDD (*n*=26)	Chronic back pain (*n*=8)	Other (*n*=26)	DISH (*n*=2)	Facet joint arthrosis (*n*=6)
Conservative (*24*)	12	6	16	6	20	12	12	2	2
Injection (*41*)	5	20	27	25	7	0	4	1	5
Surgery (*13*)	7	36	29	14	0	0	11	0	0
Further Investigation (*4*)	0	0	38	0	13	0	50	0	0
Referred elsewhere (*16*)	3	3	30	6	21	6	24	0	3
Discharged (2)	0	25	0	0	50	0	25	0	0

Table 11 illustrates the most prevalent diagnoses for each management plan. Degenerative disc disease (DDD) was most common in those managed conservatively. For patients needing an injection and surgery, stenosis and lumbar prolapse were most common respectively.

Table 12: The distribution of treatments during waiting time for the respective diagnoses

Diagnosis (%)	Treatment during waiting time (%)						
	Physiotherapy (*n*=42)	Weak opioids (*n*=42)	Strong opioids (*n*=17)	Neuromodulators (*n*=39)	Paracetamol (*n*=8)	NSAIDS (*n*=15)	No treatment (*n*=46)
Cervical disc prolapse (6)	17	17	8	8	8	25	17
Lumbar / sacral prolapse (17)	26	15	9	32	6	0	12
Lumbar spinal stenosis (28)	13	25	9	22	0	13	22
Lumbar spondylolisthesis (14)	21	25	7	21	7	4	14
DDD (13)	27	19	8	12	4	4	23
Chronic back pain (4)	13	13	13	25	0	0	38
Other (13)	27	19	8	8	4	8	31
DISH (1)	0	0	0	50	0	0	50
Facet joint arthrosis (3)	33	33	0	0	17	0	17

Table 12 shows the distribution of the treatments during the waiting time for each diagnosis. Patients with lumbar disc prolapse are more likely to be treated with a neuromodulating agent. Facet joint arthrosis and DDD were the diagnoses with the highest percentage of patients treated with physiotherapy during the waiting time.

Table 13: Age and PROMS of the patient cohort, with the age and PROMS of patients seen by GPs, physiotherapists and specialists.

	Total			GP			Physiotherapist			Specialist		
	Mean	95% CI	*n*	Mean	95% CI	*n*	Mean	95% CI	*n*	Mean	95% CI	*n*
Age (y)	54.9	52.1 – 57.7	209	52.1	43.9-60.2	58	53.1	45.2-61	59	54.7	47.4-62	64
VAS back (10 total)	6.4	6.0 – 6.8	140	5.9	4.7-7.1	58	5.9	4.6-7.2	59	5.9	4.7-7.1	64
VAS leg (10 total)	6.3	5.8 – 6.8	140	5.5	4-7.1	58	6.2	4.9-7.6	59	5.3	3.7-6.9	64
Walking distance (yards)	609	490 - 728	121	747	403-1092	58	624	284-963	59	711	372-1049	64
Disability benefit, yes:no (% yes)	35:99 (35.4%)											
Eq-5D VAS (%)	47.1	42.3 – 51.9	112	50.8	37.9-63.6	58	50.8	38.6-63.1	59	58.2	46.2-70.2	64
Expectations (80 total)	44.2	39.5 – 49.0	86	46.6	38.1-55.2	58	55.6	45.2-66.1	59	44.5	32.7-56.3	64
ODI (%)	45.1	41.6 – 48.5	134	40.4	31-50	58	44.2	34.9-53.5	59	35.9	25.1-46.6	64
PHQ9 (27 total)	11.7	10.3 – 13.2	133	10.5	6.5-14.5	58	10.4	6-14.7	59	9.3	5.5-13	64
GAD7 (21 total)	8.8	7.2 – 10.3	132	9.2	5.7-12.8	58	6.9	3.7-10.1	59	6.1	3.1-9.2	64

Table 13 highlights the demographic and PROMS data. This data was also calculated for each referring body. The expectation scores were notably higher for patients who saw a physiotherapist compared to that of a GP or specialist. The GAD7 anxiety assessment scores were higher amongst patients who were referred by a GP compared to patients referred by a specialist (physiotherapists and specialists are “specialist”).

Discussion

Evaluating the efficiency of a spinal surgeon's referral scheme is of paramount importance both topically and clinically: the burden of low back pain on the National Health Service may be contributing to its deficit, whilst the therapeutic findings of novel research may not be used to their full potential if they are practised within an inefficient framework. To our knowledge, this audit is the first to evaluate the distribution of spinal referrals and their subsequent management outcomes. It is also the first to correlate the referring body (GP, physiotherapist, specialist) to patient-reported outcome measures (PROMS).

We found that of the 210 patients who presented to the spinal surgeon's clinic, only 13% proceeded to undergo spinal surgery whilst 24% were managed with physiotherapy following the appointment. General practitioners were the referring body with the highest percentage of patients (29%) who were managed conservatively following clinic with the spinal surgeon. Twenty-two percent of referrals from extended scope spinal physiotherapists continued to be managed conservatively by the surgeon. A quarter of patients had physiotherapy during the waiting time. This was seen to be beneficial as only 7% of this cohort went on to have surgery. Spinal injections were the most common management plan (41%). There were no significant findings between the referring bodies and the PROMS.

As shown in Table 7, approximately 1 in 4 patients referred to the spinal surgeon were managed conservatively with appropriate physiotherapy following the appointment. Hence, these patients could have been managed earlier. We found that patients referred from GP's and those who did not have a referral letter (Table 8) were arguably the most likely to have conservative management (29%). In addition, extended scope physiotherapists are responsible in part for referrals that are subsequently managed conservatively. Table 8 again shows that 22% of patients referred from physiotherapists continued to be managed with physiotherapy. This proportion should be reduced because it shows that the benefits of physiotherapy have not yet been exhausted: a verdict the physiotherapist should have reached.

In order to formulate a more efficient system by discarding the referrals to be managed conservatively, a new online scheme: The Wales Patient Referral Service (WPRS) is being launched this year. This enables electronic referrals to go directly from referrer to consultant. The consultants can then carry out a number of electronic actions with each referral, including, prioritizing, returning to the GP, and redirecting to non-consultant services or clinics. When this service was trialled in Cardiology services in Cardiff University Hospital and Princess of Wales Hospital Bridgend, it resulted in a 30% reduction in consultant clinic

attendance. The spinal surgeon referred to in this audit spends 30 minutes per week triaging between 10-20 paper referrals. The new online service (WPRS) takes longer, however it results in the diversion of inappropriate referrals and allows for advice during the waiting time.

This audit found that the average waiting time to see a spinal surgeon is 8 months. It is imperative that this time period is optimized with an intervention, to firstly improve long term outcome, and secondly to prevent the back pain from becoming chronic since recovery is less likely for people who develop chronic low back pain.[9] Table 7 shows that for patients who underwent physiotherapy during the waiting time, only 7% progressed to have surgery. This is evidence that physiotherapy during the waiting time is beneficial. The evidence for physiotherapy programmes are well documented by Koes et al[9] and NICE guidelines.[3] Despite this evidence, only 1 in 5 patients (Table 3) actually engage in physiotherapy during the waiting time. Furthermore, we found that specialists are the referring body with the lowest proportion of patients partaking in physiotherapy during the waiting time (Table 9).[10,3] We found that patients with DDD and facet joint arthrosis are more likely to have physiotherapy during the waiting time, whilst those with stenosis are the least likely (Table 12). The WPRS can address this issue because the consultant receiving the referral can electronically advise the referrer on treatments they can refer the patient for whilst they are on the outpatient waiting list.

We found that injections are the most common management plan. The majority of patients either have DDD / prolapse, stenosis, or spondylolisthesis, however only 5% suffer from low back pain alone (Table 2). Root pain comprises the mainstay of symptom presentation. Root block injections have a 1 in 3 chance of leg pain relief even after one year of symptoms as shown in previous work by a consultant.[11] This therefore explains why injections are so common.
The role of injections has recently changed because NICE no longer advocates facet joint injections for low back pain (only medial branch followed by radiofrequency denervation), thus if spinal surgeons stop performing these, the other options to offer a patient becomes limited if surgery is not advised in the management of low back pain.

This study will be re-audited in two years. The following changes are anticipated to make a difference in the spinal referral scheme: a change in the spinal MDT, introduction of the WPRS, and an update of NICE guidelines.
In addition, this audit proposes several changes to the system to improve outcomes. First and foremost, the criteria for entering triage must be radically re-considered to accept referrals only if the patient has already tried physiotherapy, simple analgesics, and secondary analgesics. Secondly, following consultation with the primary care team, the referral should either be triaged to a spinal surgeon (if red flags are present or if may require surgery) or to a pain management and physiotherapy programme if surgery is not likely to be necessary. These strategies would significantly decrease waiting lists and would considerably improve outcomes.

Conclusions

In conclusion, we found that a quarter of referrals to a spinal surgeon were managed conservatively without any direct spinal surgeon intervention procedures (i.e. injection or surgery). General Practitioners are the referring body with the highest percentage of patients managed conservatively. Physiotherapy during the waiting time is implemented in 1 in 5 patients. To address these findings: The Welsh Patient Referral Service, criteria to enter triage, and a more efficient use of the physiotherapy outpatient department. This may occur secondary to the new NICE guidance on low back pain and sciatica.

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