

Integrating Interventional Pain Therapy And Cognitive Behavioral Therapy: What Comes First?

M Almajed

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Abstract

The multidimensional nature of the pain experience present a management challenge when the multidisciplinary team identify biomedical as well as psychosocial derangements that are amenable to specific treatments. The question becomes a prioritization issue as it is difficult to run both treatments simultaneously. In this case report, after the initial multidisciplinary assessment of this middle aged working man with low back and leg pain, several management approaches were utilized. These approaches included biomedical interventions (nerve blocks and neuroaugmentation) as well as cognitive behavioral therapy. Biomedical management can produce good results but they may also increase patient's reliance on passive approaches and fuel pain behaviours and sometimes fail to provide a solution to a multifaceted pain presentation. On the other hand, cognitive behavioral therapy (CBT) approaches have proven to have successful outcomes but they commonly emphasize on reducing reliance on passive approaches (use of medications and increasing demand for interventions), which sometimes can be contradictory to biomedical management if both are carried out simultaneously. Patients with such presentations still pose a challenge to the multidisciplinary team in deciding on what needs to be addressed first. There are many reports including clinical trials and systematic reviews that support each modality but when it comes to integrated management, the literature is scarce especially in terms of high quality randomized controlled trials.

CASE REPORT

HISTORY OF PRESENTING COMPLAINT

In February 1999, Mr.H had a fall while walking up some stairs. He had a tool case in his hand at the time. Following the fall he had right-sided low back pain which he initially did not take much notice of. However, the pain persisted and he was then seen by his GP He was treated with physiotherapy, anti-inflammatories and Tylenol III.

The pain was settling down and two months later when he had a physical examination for medical insurance purposes, he was asked to bend forward which he recalls resulted in a right leg pain. A CT-scan was done on the 5th of March, showing a posterior disc protrusion at the L5/S1 level. Mr.H continued to have increasing pain in the lower back and the right leg and was advised to take time off work on several occasions related to his pain. Due to the continuing report of pain and "numbness" in the right leg he was referred to a neurosurgeon who saw him in July, 1999, and ordered lumbar MRI scan that showed mild focal L5/S1 posteriolateral disc protrusion with slight thecal sac and right S1 nerve root compression. Surgery was not indicated, and was he told that it might not provide any benefit.

Mr.H continued to have pain and continued taking analgesic medications in addition to using a TENS machine. He gradually returned to full time (6 hrs/ day) work by December 1999. He was advised to avoid heavy lifting and prolonged sitting (as when driving for long distances).

PAIN HISTORY

He reported a right-sided low back pain, which radiates to the anterior thigh, the right calf and the dorsum of the right foot. He described the pain as continuous with variable intensities. He used the following McGill Pain Questionnaire (MPQ) words to describe his pain: shooting, stabbing, sharp, wrenching, aching, exhausting, radiating, and numb.

On a numerical rating scale (NRS), he reported the following pain intensities:

Intensity during the interview: 10/10

Highest and lowest intensities the week prior to the interview: 6/10 and 10/10

Usual pain intensity: 8/10

He described the following aggravating factors: movement especially lifting and bending, cold and wet weather, sex,

and driving.

He described the following to help when he is in pain: warm/hot showers, analgesic medications, hot packs, massage and the TENS unit.

He denies any personal or family history of cancer, report no fever, sweats, bladder or bowel dysfunction or weakness in the lower limbs. He reports some weight gain since he started taking antidepressants.

PAIN IMPACT

Mr.H continued full time work in spite of his pain. He is unable to assist with any household activities and tends to overdo activities when he gains pain relief from analgesic medications. He can only drive for a limited period of time. His walking is limited to 100 meters and when not working he spends his time lying flat resting. His ability to play with his children decreased as well.

Prior to the injury he was actively involved in mountain biking, riding and snow skiing all of which he ceased since his injury. He reports waking up at night due to the pain but he can get good sleep on some other nights. He also reports that pain limited his sexual activity.

MEDICATIONS (AT THE TIME OF ASSESSMENT)

Paracetamol 500 mg with codeine phosphate 30 mg, 2-6 tablets/day

Rofecoxib 25 Mg, one tablet Nocte

Fluvoxamine 100 Mg, one tablet Nocte

Clonazepam, 0.5 Mg Nocte. (Started to treat twitching of the right leg at night)

The following medications have been tried in the past but were stopped:

Tramadol, Celecoxib, Amitriptyline, Sertraline, Orphenadrine

He also had the following aids/treatments:

TENS, physiotherapy, restricted exercise program, lumbar support, walking cane.

PATIENT'S BELIEFS

At the time of assessment Mr.H believed that his pain is due to a "disc pinching on a nerve". Mr.H did not think his pain is due to a sinister cause and

PATIENT'S EXPECTATIONS

Mr.H expected a 60%-70% reduction of his pain to be able to cope with it and resume reasonable activities. He does not think that his pain will change and expects some form of pharmacological treatment out of this assessment.

PAST MEDICAL AND SURGICAL HISTORY

Obstructive sleep apnoea. Currently uses nasal CPAP machine.

Depression

Injury to the left index finger following a circular saw accident in 2001 which is resolved now.

Appendectomy in 1965

Measles in childhood.

FAMILY HISTORY

Nil of note

SOCIAL HISTORY

Mr. H has been married for 15 year and has three teenage children. They all live in one house with no apparent problems. His education level is a college degree and works full time as computer technician. He does not smoke and only drink occasionally. He denies any illicit drug use. As for recreation, he stopped all outdoors sports activities since his fall.

PSYCHOLOGICAL ASSESSMENT

This was carried out through a clinical interview as well as through the use of psychological pain questionnaires.

Mr.H attributed his depression to the injury he sustained to his finger in 2001, however he mentions that his mood is reasonably stable now. He reports a pain-related disability in terms of limited ability to work, stand, drive, or do house work. His pain prevents him from playing with his children. Pain also limited his sexual activity with his wife and seriously disturbed his sleep. Prior to the fall, he was actively involved in mountain biking, snow skiing and horseback riding all of which are stopped now. His way of managing his pain is through taking medications, physiotherapy exercises, applying hot packs to his back, taking warm showers, use of electrical blanket, use of TENS unit, avoidance of physical activities. Based on the interview and the questionnaires results, Mr.H reports significantly higher pain intensity than the clinic's average. His depression, anxiety and stress scores are less than our clinics average and in fact less than normal which could downplay the importance of these factors in his presentation or could

be attributed to his ongoing antidepressant treatment. Based on the SF-36 he reports a better general and mental health than our clinic average. On disability measure, Mr.H shows a significant level of disability that is higher than our clinic mean by one standard deviation. He shows a high level of fear-avoidance beliefs and has low pain self-efficacy beliefs. He scored higher than the clinic average on coping and surprisingly scored lower than average in terms of catastrophising, which may also explain his low depression scores.

In summary, Mr.H present with high pain intensity and significant disability due to his pain. He has significant fear-avoidance behaviour and he does not seem to have ongoing depression, anxiety or stress in relation to his presentation but have low self efficacy which may explain his disability level.

The following tables show Mr.H's pain questionnaires results in comparison to our clinic means for patients at presentation, and the standard deviations (SD) :

Figure 1

Multidimensional pain inventory		
<i>Dimension</i>	<i>Mr.H</i>	<i>Average/SD</i>
Pain severity	8	6.2(2.02)
Pain interference	5.545	4.2(1.2)
Life control	3.5	2.9(1.3)
Affective distress	2.33	3.4(1.3)
Social support	5.33	4.6(1.4)
Punishing responses	6	2(1.5)
Solicitous responses	n/a	3.5(1.5)
Distracting responses	4.5	2.4(1.4)

Figure 2

SF-36		
Dimension	Mr.H	Average/SD
Physical	15	38(24)
role physical	0	14(28)
Body pain	10	26(19)
General health	67	50(25)
Vitality	20	34(21)
Social function	25	42(26)
Role emotion	66.67	41(43)
Mental health	92	54(21)

Figure 3

DASS		
Dimension	Mr.H	Average
Depression	1	5
Anxiety	3	3
Stress	1	8

Figure 4

PRSS		
Dimension	Mr. H	Average
coping	3	2.6 (1.15)
Catastrophising	1.33	2.8(1)

Figure 5

	PSMC	Tampa	PSEQ	RMDQ
Mr.H	36	43	21	17
Average	n/a	40	23	13.5

PHYSICAL EXAMINATION

Mr.H was wearing a glove to support the left index finger, a lumbar support, a TENS unit and was using a walking stick for stability.

He had an antalgic gait and posture, with increased weight bearing on the left leg. Muscle bulk was normal in both legs. All spinal movements were restricted and guarded. Combined extension/lateral flexion to the right reproduced the low back and right leg pain.

Bilateral straight leg raise test was unremarkable.

Examination of the back showed tenderness on palpation at L3-S1 centrally and L4-5-S1 to the right side.

Neurological examination of the lower limbs revealed normal motor tone, power and reflexes.

Sensory examination of the lower limbs showed and non-dermatomal decrease in sensation to pinprick in the right and the left anterior areas of the thighs as well as the medial and lateral aspects of the calf areas.

INVESTIGATIONS

05/03/1999 CT scan of the lumbar spine showed mild to moderate posterior disc protrusion/extrusion at L5/S1 level.

23/07/1999 MRI of the lumbar spine showed mild focal right L5/S1 postero-lateral disc protrusion causing slight thecal sac and right S1 nerve root compression.

20/09/00 MRI of the lumbar spine showed degenerative disc bulge at the L5/S1 level, no evidence of S1 root compression.

06/3/02 MRI of the thoraco-lumbar spines showed mild thoracic spondylosis, no spinal cord compression, L5/S1 broad based moderate postero-central protrusion with no impact on canal diameters although close to the right S1 root origin.

15/04/03 MRI of the cervico-thoracic spine was reported normal.

DIAGNOSTIC FORMULATION

BIOLOGIC MECHANISMS

Mr.H presents with lumbar spinal pain with possible radicular right leg pain associated with the prolapsed L5/S1 Intervertebral disc (IASP Taxonomy: 503.91cS and 603.91R). He may also have a contributing lumbar Zygapophysial joint pain with referral to the right leg (IASP Taxonomy: 533.91kC)

PSYCHOLOGIC FACTORS

Mr.H presents with maladaptive responses to his injury and the subsequent pain with significant fear-avoidance behaviour which has lead to activity avoidance and disability. He does not pace his activities to adjust for his pain and his coping skills are passive and rely heavily on resting and taking analgesic medications. His prior history of depression may or may not be related to his current pain presentation.

SOCIAL FACTORS

Mr.H has an ongoing litigation with the insurance company and report that the company is currently accepting to fund his health care expenses. However, it is hard to know the impact of litigation and insurance at this stage of his illness.

MULTIDISCIPLINARY MANAGEMENT

Based on the above information the multidisciplinary team suggested the following management approach:

BIOMEDICAL

- a) Optimization of his medication by stopping Vioxx and switching from tylenolIII to regular paracetamol and trial of Tramadol or long acting opioid.
- b) Diagnostic right sided lumbar medial branch blocks at L4/5 and L5/S1 levels to delineate if there is a contributing Z-joint pathology. If he responds well to the blocks, he may

undergo a radiofrequency rhizotomy of the Z-joints tested.

c) Further followup and adjustment to his pain medications will be arranged and depending on his response, other management options might be suggested.

PSYCHOLOGICAL/BEHAVIOURAL

Given the apparent maladaptive response that Mr.H developed with his pain presentation, we suggest that he participate in a cognitive behavioural therapy program.

PROGRESS

On 05/02/02, Mr.H had a diagnostic right sided medial branch block of the L4/5 and L5/S joints which was not considered to have good response. He was started on Tramadol and on further followup but he continued reporting the same pain intensity and was using the TENS unit and the lumbar support. Tramadol was ceased and he was requesting to go back on TylenolIII. His litigation issue with the insurance company is not settled but meanwhile, they agreed to pay for his medical management.

On October/November, 2003 he participated in an intensive 7- week hospital and home based CBT program. At the end the first stage (3 weeks in hospital based), all medications were ceased except his antidepressant. His use of the lumbar support was also stopped but he continued using the walking cane. His functional ability improved based on objective measures, and he made significant physical improvement and was instructed to continue the physical and psychological methods that he was shown in the program.

However, on further followup, in spite of using the strategies learned at the CBT program, Mr.H was reporting the same high pain intensity in the back and the leg and was keen on exploring other options. He was arranged to have a trial of spinal cord stimulation.

On 02/06/04 Mr.H underwent a trial of spinal cord stimulation which provided him with significant pain relief. He was arranged to have a permanent spinal cord stimulator implanted later on.

On 14/07/04 Mr.H had a spinal cord stimulation system implanted and stimulation was as good as the trial which he reported provided him with 75% pain relief. He was discharged from hospital and Mr.H will be seen in followup to assess the overall outcome.

DISCUSSION

The biopsychosocial model of illness and pain suggested by

Engel and Fordyce and later by Loeser and others has influenced the management of patients in pain clinics (1, 2). Multidisciplinary and interdisciplinary pain clinics utilizes inputs from several health care professionals in the assessment and management of pain patients (3).

Mr.H had a multidisciplinary assessment and the following will highlight some of the important issues in that process.

Psychological assessments is an integral part of the process along with assessments by others in the core group of the multidisciplinary team, it involves evaluation of current psychosocial functioning, personality, social and relationship functioning, mental status and so forth and that help to determine whether there are any significant “barriers” to rehabilitation; and provide treatment to help patients to progress through the program (4). Specific goals of psychological assessment were suggested by Romano et al. as to identify: (a) psychosocial factors that may affect pain perception and behavior as well as functional impairment, (b) specific treatment goals for each patient and (c) intervention strategies that may produce maximum patient improvement (5).

It is also thought that psychological factors play an important role in the prognosis of some pain conditions especially in regards to disability (6). Vlaeyen proposed the fear-avoidance model, based on that and other pain related-psychological studies, the idea of “yellow flags” being important psychological warning signs that need to be recognized and addressed have become an essential element in the psychological evaluation of pain patients. These are divided into four main areas: work related belief related, behavioral and affective. In addition to the classical clinical interview, the use of questionnaires here is a popular and efficient way in this evaluation process.

Mr.H had both, and the case history showed the result of that assessment and therefore, his suitability to benefit from a cognitive behavioral pain program. For a detailed description on different psychological constructs involved in that testing and the tools used in that assessment in terms of validity, reliability and a specific description of each of those questionnaires please refer to attachment (A) included at the end of this report. In terms of the effect of the ongoing litigation with the insurance company on Mr.H presentation, it is unclear as Mr.H reports that the issue is only about payment of medical expenses.

A full pain history should be based on a biopsychosocial

approach. This approach will involve a biomedical history which is usually conducted by a physician aiming to establish rapport with the patient, establish a putative tissue and mechanism diagnosis differentiate between acute and chronic as well as nociceptive and neuropathic pain, assess prior treatment efficacy, check for red flag conditions and uncover any major issues like substance abuse or legal agendas (7). In 1937, Ryle's suggested elucidating eleven features in regards to patient's complaints of pain (8).

Figure 6

Table 1: Ryle's pain list (8).

<ul style="list-style-type: none"> • situation • Radiation • Localization • Character • Severity • duration 	<ul style="list-style-type: none"> • frequency • relieving factors • aggravation factors • special times • associated symptoms
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More recently, the NHMRC produced some guidelines in regards to taking proper pain history (9). As for the physical examination in relation to back pain, the existing evidence base shows that no particular clinical sign, or a combination of signs, found by this process, allows a valid or reliable diagnosis of the back pain to be made in anatomical or pathological terms (10). However, many clues can be found or elicited on examining the pain patient which in combination with other parts of the assessment can confirm or rule out possible diagnoses. Mr.H had a general examination and further neurological examination in relation to his back pain that ruled out the possibility of significant neuropathy.

Furthermore, the possibility of red flag conditions being the cause of his pain was ruled out based on the history, physical examination and the imaging studies. Mr.H was thought to have low back pain with radiation to the right leg attributed to the disc prolapse found on the MRI scan (1999) causing slight thecal sac and right S1 nerve root compression. But due to the fact that the pain involved more leg distribution than what could be explained through this mechanism alone, it was also thought there might be an element of facet Joint referred pain. Therefore it was justified that he gets the diagnostic medical branch blocks.

The prevalence of zygapophysial joint pain is reported as 15% in young injured workers and up to 40% in older patients (11, 12). The two most common levels involved are

L5/S1 and L4/L5 (11, 14); therefore it is common that interventional pain specialist perform blocks at these two levels. Mr.H had diagnostic medial branch blocks of the right L5/S1 and L4/L5 facets and the response was negative. This indicated to a large extent that the facet joint had no contribution to his low back and right leg pain.

CBT is the application of the principles of learning as well as empirically-derived methods to, (a) change the ways in which pain sufferers perceive and react to their pain and (b) help these patients develop better coping skills to adjust more effectively to the continuing demands of chronic pain. CBT is targeted at each specific area identified at the assessment process- for example: inactivity (activity avoidance), depressed mood, unhelpful beliefs or fears, and excessive reliance on medications (14). As for the efficacy of CBT or what sometimes is referred to as multidisciplinary treatments (MDT), a systematic review has concluded that MDT was superior to no treatment, waiting list controls, or single-discipline treatments and cautioned that the quality of design and study descriptions were marginal. As the authors indicated, most of the original studies included in the review are considered weak in the current standard of assessing trials (15). In another review included 25 trials on chronic pain patients. The conclusion was that when compared with the waiting list control (WLC) conditions, CB treatments were associated with significant effect size on all domains. Compared to other active treatments CB treatments had a significantly greater changes for the domains of pain experience, cognitive coping and appraisal and reduced behavioral expression of pain. The authors also raised concerns on difficulty in blinding in CBT trials as well as how difficult it is to obtain dichotomized outcome in this field (16). Another review showed strong evidence that intensive multidisciplinary biopsychosocial rehabilitation with functional restoration (MDBRFR) improves function when compared with inpatient or outpatient non-multidisciplinary rehabilitation. It also showed moderate evidence that intensive MDBRFR reduces pain when compared with outpatient non multidisciplinary rehabilitation or usual care (17). Bogduk argues that there is contradictory evidence in the result of this review and what was shown was considered in term of vocational outcomes (18).

It was finally possible to secure a place for Mr.H in a CBT program which happened to be after he showed no improvement with the diagnostic medial branch blocks. Mr.H participated in an intensive 7-week CBT program that

included a 3-week hospital based full time attendance and 4-week home based management. At the end of the program all his mediations were ceased except the antidepressant. His physical disability was thought to have at least normalized to the pain clinic average. His confidence in his ability to manage his pain was thought to have worsened compared to his status at presentation. He was reported to continue having fear-avoidance beliefs and as for his catastrophic thinking, it was thought to have significantly improved.

Spinal cord stimulation for the treatment of chronic pain is another intervention that proved to be effective. In terms of evidence based medicine, a recent updated review by Turner et al looked at the effect of spinal cord stimulation on pain and functioning and the rate of complications (19). The review included patients with CRPS and FBSS. They included 3 studies on FBSS. The studies were rated as class III evidence-base wise (all were case series). There analyses were as follows:

STUDY 1 (KUMAR ET AL. 2002)

Included were 60 patients, 44 failed trials and were not implanted. 5 year follow-up showed: no report on effect on pain. SCS group improved 27% compared to non-SCS group 12% on disability measure. 15% of SCS compared to 0% of non-SCS group returned to work. Complications were not reported.

STUDY 2 (DARIO ET AL. 2001)

Included in the study were 20 patients who responded to medical treatment, and 23 patients who did not respond to medical treatment, and received SCS implants. 42 month follow-up (mean) showed the following: a) the medical group mean pain scores decreased from 76 to 25, mean disability decreased from 23 to 6. In the SCS group, mean pain scores decreased from 85 to 22, mean back pain decreased from 45 to 40. And disability scores decreased from 12 to 9. The conclusion was that the medical group was significantly more improved than the SCS. Complications were not reported.

STUDY 3 (OHMEISS ET AL. 1996)

Included 40 patients followed at 12 and 24 months. Leg but not back pain improved (7.4-5.6 at 12 months, 6.3 at 24 months on 0-10 scale), physical disability and total (physical and psychosocial disability) improved significantly at 12 and 24 months; no patients worked before implantation, four were working 2 years later. Complications reported in 33% of the patients.

The reviewer's general conclusion calls for improvement in the design and report of future studies to prove the efficacy and safety of SCS.

Cameron reviewed the literature on SCS and chronic pain for a 20-year period (1981-date of search). Using acceptable inclusion/exclusion criteria, the review included 16 studies on back and/or leg pain as an indication for SCS implantation, these studies were comprised of 616 patients. two of these studies were prospective controlled, eight were retrospective without matched control, and six were retrospective (20). Outcomes on success rates in treated patients (defined as 50 % reduction) varied between 26% and 86%, with most studies reporting around 60-65% success rate. Some studies also reported significant reduction on the use of opioid medications. Complication rates were similar to what Turner et al. reported.

Not long after going through the CBT program, Mr.H continued to view pain as something he could not handle in spite of applying all what he learned at the CBT program. After further assessment and given the fact that no further psychological pain therapy can be explored to help Mr.H with his ongoing pain, it was finally decided that Mr.H receive a trial of Spinal cord stimulation. He was keen to have that done and the trial was considered very successful based on his report that for the first time he was getting adequate pain relief. He received a permanent implant

On 14/07/04 and on a follow-up assessment in the clinic he continued to report 75% reduction in his pain. Further psychological and functional assessment is planned at specific time intervals to evaluate Mr.H response to the SCS and the CBT.

CONCLUSION

Spinal cord stimulation and CBT are two major interventions in pain management that are widely used in many pain centers; they have comparable success rates and continue to prove their efficacy. Although there is a lack of high quality randomized control trials on each of these modalities; there is some evidence that support using these two interventions in pain patients. As seen in this case report and what seems to apply to many pain patients, who receive implantable pain interventions, it is difficult to predict how they will respond to an intervention. When a patient is thought to qualify for both treatments, what should they receive first, the CBT or the SCS. Should Mr.H have received the SCS then attended the CBT to complete the management plan rather than what actually happened. There

are no clinical trials available that could provide an answer to this important question.

CORRESPONDENCE TO

Mohammad Almajed Department of Anesthesia , KKHU:
P.O. Box 7805, Riyadh, Saudi Arabia 11471
alamdolor@yahoo.com

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Author Information

Mohammad Almajed, MBBS, FRCPC, Grad cert Pain Med
Pain management fellow, Royal North Shore Hospital