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Research Article

Dynamics of Chronic Back Pain

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Abstract

Introduction: Chronic back pain is a major cause of physical disability, absenteeism from work, and legal claims. Its prevalence has increased from almost 4% to over 10% in recent decades, using substantial healthcare services. The persistence and chronic back pain after multiple operations and treatments is often called "failed back syndrome."

Method: This paper investigates how chronic back pain develops, why it may be associated with psychosocial change, and why it is important to evaluate and treat each patient as an individual based on evidence. It is based on literature review and personal experience.

Results: The anatomical structure specific to the spine, the outcome of treatments, and the patient's perception of pain are the most contributing factors for chronic back pain. The closely located facet joints, discs, ligaments, muscles, spinal cord, and nerve roots, each can be involved in causing back pain and each may need a specific treatment. Those increase the chance for difficulty in determining where the pain comes from, complication, inadequate treatment, and recurrence of the pain. Because of extension of the nerve roots away from the spine, erroneous operation can take place in other organs.

Conclusion: Treatment of chronic back pain is difficult unless its source is clearly identified and its correlation with the neurological and radiological finding is clearly determined. Yet not every chronic back pain is a failed back syndrome. Each chronic back pain has a different cause, each needs a different solution, and each patient needs a new evaluation first, disregarding previous diagnosis.

Keywords: Dynamics of chronic back pain; Failed back syndrome; Emotional change in chronic back pain; Evaluation of chronic back pain; Management of chronic back pain

Introduction

Pain is an unpleasant sensation that often heralds an illness. It is one of the most common complaints by patients and a condition for which patients seek help. It is estimated that 20% of adults suffer from pain globally and 10% are newly diagnosed with chronic pain each year [1]. In 2016, an estimated 20.4% of U.S. adults had chronic pain and 8.0% had high-impact chronic pain [2]. It is also estimated that 20% of pain in acute conditions converts to chronic pain [3]. Chronic pain affects approximately 100 million adults in the United States; that together with the healthcare cost and productivity loss was estimated to be from $560 to $635 billion dollars in 2010 [4]. Chronic back pain is a major cause of physical disability, absenteeism from work, and legal claims. It is estimated that 50 to 80% of adults will have at least one episode of back pain during their life [5]. A survey by Freburger [6] and co-workers revealed that in 16 years (1992 to 2008) the prevelence of chronic low back pain increased from 3.9% to 10.2%, resulting in substantial use of healthcare services, medications, and operations.

Method

This paper investigates how chronic back pain develops, why it may be associated with psychosocial change, and why it is important to evaluate and treat each patient as an individual, based on the evidence. When back or leg pain lingers despite treatments and operations, it is often called "failed back syndrome." Some may disagree with the term calling it a "misnomer." [7] This paper is based on the review of the literature and on personal long-term clinical and surgical experience on conditions that cause chronic back pain. Three essential factors contribute to chronic back pain: the anatomical structure specific to spine, the outcome of treatments, and the patient's perception of pain. Other factors, such as incentives, health system, and litigation also can play a part. To be able to diagnose the cause of the chronic back pain or failed back syndrome, we need to understand the degree to which each factor contributes and based on evidence predict what treatment may be of help.

Anatomical Structure of Spine

The spine is the central pillar of the body, contains numerous anatomical structures: bone, multiple closely located facet joints, discs, ligaments, muscles, spinal cord, and nerve roots. Each structure can be affected by diseases and cause pain, limitation, and disability. When the pain originates from one structure such as one herniated disc with clear and correlating neurologic and radiologic findings, the diagnosis is easy and if it needs operation, the outcome usually is successful. However, as the number of involved structures add up, the pain from several nearby involved structures such as multiple levels spinal stenosis, scar formation, inflammation, or infection can all be felt in one location, while each structure may need different treatment or specific management. Symptoms such as muscular spasm, difficulty in bending and walking, history of trauma, and bulging disc, while each can be associated with back pain, they are not evidence for the need of operation; for they can come from conditions such as: pregnancy, uterine fibroid, referred pain from other organs, or temporary musculoskeletal stress.

Radiologic Evaluation

The use of Computed Tomography Scan (CT) since early 1970 and Magnetic Resonance Imaging (MRI) since early 1980 have made major advancements in diagnosis and treatment of back pain, especially for trauma, disc disease, and osteoarthritis. When the radiologic findings correlate with the location of pain and neurological abnormality, they contribute a major help in diagnosis and choice of appropriate treatment. Yet, abnormal CT and MRI of the spine with no correlation to the symptoms are not evidence for the need of operation; for the source of the pain can be elsewhere.

Outcome of the Treatments and "Failed Back Syndrome"

If after the operation, the pain remains, it is not always easy to find the cause of pain. In a detailed review of the literature Chen and coworkers [8] enumerate factors that contribute to the failed back syndrome. The reasons are often multiple but in general the cause can be related to presence of extensive structural damage, **e**rrors in diagnosis, operative complications, inappropriate choice or inadequate treatment, progressive degenerative change, and patient's behavioral or incentive-driven causes.

Extensive Structural Damage

Trauma, multiple operations, or infection may be so extensive that no additional operation is deemed effective. In a review article, Ragab and Deshazo [9] report an estimate of over 80,000 "failed" back surgeries per year. Of these, 19% required reoperation for pain or complications of surgery over the ensuing 11 years. The success rate is estimated to be 60%, dropping to 30% after a second back surgery, 15% after the third, and 5% after the fourth.

Errors in Diagnosis

Because spinal nerves extend far from their origin as in arms, trunk, and legs, the pain of a lesion in the spine may be felt mostly away from the spine lesion. In addition, the sensation in each part of the skin is covered by three overlapping dermatomes, demonstrated in cats [10] and likely is the same in humans. Thus, the anesthetic area of the skin by one nerve root is narrow and can be missed on examination. Consequently, as with the examples below, one may erroneously operate or treat an organ beneath where the pain is felt, thereby the original pain remains (Figures 1-4). One arrow points to tumor, double arrows to spinal cord.

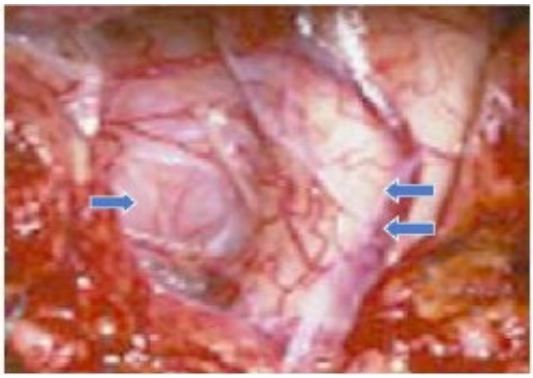

Figure 1: A meningioma at C1-C2 area in a patient first treated for headaches, while the cause of pain was C2 nerve-root compression.

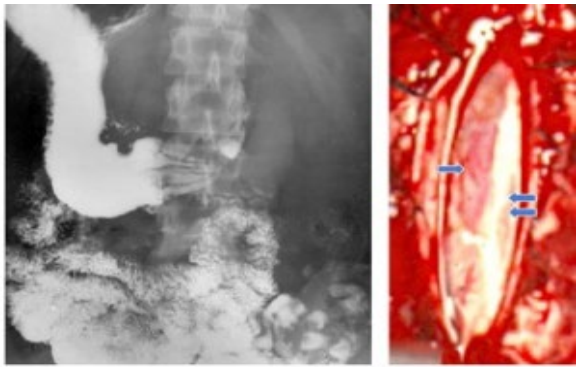

Figure 2: A neurofibroma in the thoracic region of a patient caused severe abdominal pain, but the patient was sent home because studies had ruled out a presumed pancreatic tumor.

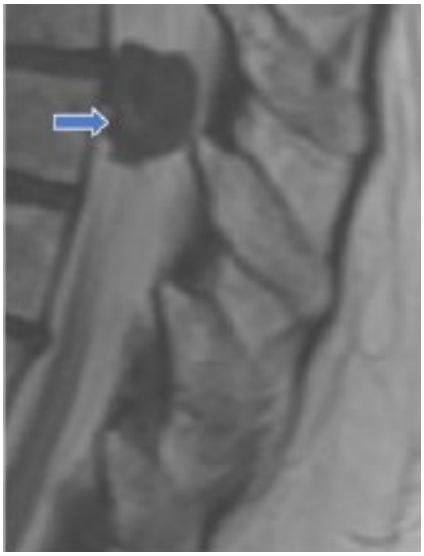

Figure 3: The MRI of a thoracic spine of meningioma in a patient who first was erroneously operated for cholecystectomy.

Figure 4: Abdominal scar and spinal cord tumor in a patient who first had erroneous operations for cholecystectomy, appendectomy, hysterectomy, and abdominal exploration.

Operative Complications

Technical advancements and innovations in spinal operations and instrumentation have considerably improved treatments of spinal disease. Yet, new techniques are associated with new complications. Between 2002 and 2007 the frequency of complex fusion procedures for spinal stenosis in the U.S. increased 15-fold, a change which was associated with increased risk of major complications, 30-day mortality, and over-use of resources [11]. Similarly, a 2003-2013 study in Australia showed the fastest increasing procedure was complex fusion, with the odds for major complications quadrupling with complex fusion procedures as compared with simple fusion [12] caused by progression of osteoarthritis or recurrence of disc herniation. The pain in spinal stenosis is usually periodic in the beginning. Over months or even years the episodes become closer, occurring with lesser physical activities, stay longer, and neurological deficits occur; it is then that there may be the need for operation. Operation in the early episodes may not be needed. Oh JT, Park KS, Jung SS, et al. [13] found 10% recurrence after diskectomy within 6- 61 months

Perception of Pain and Reactions

Because pain signifies an illness and because back pain causes limitation in physical activities, the emotional change is natural and present in everyone However, when there is intense fear and anxiety disproportional to the clinical finding or that which causes disability, the condition may become a secondary illness, and some may call it "psychogenic." However, the fear and anxiety may have stemmed from genuine pain, the nature of which is obscure to the patient, misunderstanding or miscommunication. When there are minimal objective clinical or radiologic findings, some may diagnose the pain as psychogenic and based on the way the patient expresses the pain, yet we express our pain differently. In 1952, Mark Zborowski [14] studied the ways people responded to and expressed pain based on their culture, background, and ethnicity. Some tended to be emotional or exaggerate; others were less emotional, simply reported the location and duration of the pain; some were happy that their pain was alleviated; others while happy, remained concerned about the underlying cause of what was to happen to them.

Incentives and Motives

When back pain is the result of trauma, it is natural for patients to complain about pain, as others do, or to seek compensation for medical expenses and losses. However, the patient can have legitimate pain and suffering. A patient addicted to narcotics may make frequent visits to receive prescriptions for the addictions, (Hydrocodone is the number one prescription painkiller used and abused in such cases) [15,16]. While addicted, the patient may also have legitimate pain.

Discussion

Medical treatment in the past was based on experience and on opinion about the therapeutic effect of a treatment. As medicine became more scientific, the statistical results, randomization, and evidence-based became essential for proof of effectiveness of a treatment. Experience still is valid, but it can be associated with certain degree of positive or negative bias; for an improvement may be caused by the passage of time and the ability of the body's healing mechanisms, rather than the treatment.

"Psychogenic" Pain

In 1999, before the 11th annual meeting of the Canadian Neurological Society, in his presidential address, Allan Walters suggested "psychogenic regional pain" for conditions where pains "come and go under the influence of meaningful life situations and are felt in a region of the body." His address was later published

in Brain [17]. Adopting the same terminology Dr. John Sarno in his book Healing Back Pain [18] wrote, it " appears that the brain will choose from a large repertoire of painful and nonpainful disorders when it needs to defend against painful or undesirable feelings." He also believed that certain pain in the back, neck, and other parts of the body is "psychosomatic" or "Tension Myositis Syndrome (TMS)." He also believed that TMS "is the major cause of the common syndromes of pain involving the neck, shoulders, back, buttocks, and limbs" and that "symptoms are likely to be psychogenic when there are limited or no objective findings" originating from conditions such as stress and previous physical and sexual abuses. His treatment protocol consisted of instructing his patients to set aside at least fifteen minutes a day to relax and quietly think of series of statements denying the organic nature of the pain.

There is little doubt about the association of psychological, behavioral, and cultural influences on perception and expression of pain. However, in over 50 years of evaluation, treatments and operations for varied spinal diseases and other conditions, many of whom needed cordotomies several decades ago [19-21] to alleviate pain, this author is not convinced of the existence of "psychogenic" pain, nor is there any scientific evidence. The fact that psychotherapy and psychotropic medications help a patient to cope better with pain, does not prove that the pain is psychogenic. Furthermore, in the official publication of the American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders DSM-5, the term "psychosomatic disorder" is no longer used. Instead, "Somatic Symptoms and Related Disorders" is used [22].

That is not to deny the contribution that professional clinicians such as Dr. Sarno have made in helping patients who suffer from chronic back pain through communication, discussion, and establishing a mutual rapport and needed doctor-patient relationship in patients with no evidence for the need of operation. The emotional stress caused by fear, anxiety, and unwarranted concern about illness and disability are as equally disturbing as pain is.

Treatment and Management of Chronic Back Pain

Despite its initial severe intensity, around 70% of acute back pain with no significant nerve-root compression recover spontaneously. Randomizing 50 patients with long-standing moderate lumbar spinal stenosis into a surgical group and 44 patients into a non-operative group, Slätis and coworkers [23] found that operations provided "modest but consistent improvement in functional ability, surpassing that obtained after non-operative measures." Eventually, around 30% of patients with persistent back pain need an operation to decompress the nerve root(s), spinal cord, or cauda equina caused by large herniation disc, osteoarthritis, spinal stenosis, or structural deformities. Conditions with severe unrelenting pain associated with neurological abnormalities usually require operation. Unwarranted delay, physiotherapy, and injections only prolong the patient's suffering. Those with spinal cord or cauda equina compression usually require urgent operations.

Despite the difficulty to find a suitable and effective treatment for failed chronic back pain, it is important to consider that not every chronic back pain is "failed back syndrome." To help such patients one needs to have a fresh approach: the following approaches can be helpful.

- To begin with, being aware of 'first impression bias," that can interfere with evaluation, examination, and treatment of such patients,
- Listening to the patient in detail about the history of the onset of the pain and its intensity before and after each treatment,
- A patient, despite having incentive motivation requires evaluation, as does a patient with narcotic addiction. For both, to see what treatment if any is appropriate. Neither needs judgment; that is for other experts to deal with,
- Evaluation to see if there are any objective clinical, neurological, and diagnostic test that correlates with the location and the nature of the pain. That is the most important task before any recommendation.
- Followed by attention to possible presence of a lesion in the abdomen, pelvic or retroperitoneal region,
- The potential need for new radiologic evaluation, if the previous one(s) are old or are prior to the onset of new pain,
- Attention to possible intra-foraminal disc herniation, altered instrument position, or a compressive lesion above or below previous operations.

In patients with multiple operations, frequently there is evidence for certain objective clinical or radiological finding; the question remains if there is any evidence that further treatment, especially an operation would help, or the pain is severe enough to need one. Conversely, one may find significant objective findings that correlate with unrelenting pain; then there may be the need for specific related medical or surgical treatment. A patient with disproportionate anxiety and fear may need expert treatment and a patient with addiction may need referral to related expert or centers.

Conclusion

Chronic backpain results from varied pathological alterations, occurring with or without treatments. When the pain remains persistent after multiple operations, it is often referred to as "failed back syndrome." Evaluation and treatment of chronic pain and "Failed Back Syndrome" require specific attention to

the history of the pain prior to and after each treatment. Concern, fear, or anxiety is often associated with chronic backpain as it is with any chronic pain; it is essential to see if there is any objective finding that a specific medical or surgical treatment can help.

Diagnoses of "failed back syndrome," or "psychogenic pain," can be attached to a patient's condition permanently and hinder future search for possible solutions. It is preferable to refer to it as chronic back pain of yet unknown cause or with no response to treatment.

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