Basrah Journal of Surgery

Leading Article

Bas J Surg, September, 8, 2002

NON-SPONDYLOGENIC LOW BACK PAIN

Thamir A. Hamdan[*] & Mubdir A. Mohammed Saeed[@]

[*]FRCS, Professor Orthopaedic Surgery, [@] FICMS, Specialist Orthopaedic Surgeon, and Lecturer Department of Surgery, College of Medicine University of Basrah, Basrah; IRAQ.

Introduction

Backache is a remarkably common condition, hardly if ever one will not get some sort of back pain in his life. It is estimated that 60-90% of the adult population have experienced low back pain. 2-5% affected on a yearly basis, 10-20% of female manifested back pain during menstrual period [1].

There are a list of causes for back pain, with wide range of classifications, but one point should not be forgotten and that is the cause of back pain is not always related to the pain sensitive structure in the spine. Some of the pain are referred to the posterior portion of the spinal segment, that innervates the diseased organs of the pelvis, abdomen or thorax. So pain arise in the back may be referred to other parts and pain in the back may be related to other anatomical structure. The differentiation between the two sources of pain is of vital importance in clinical practice.

The reason behind writing this article is to stress the importance of the non-spondylogenic causes of low back pain and to suggest a new classification for low back pain.

Correspondence to:
Dr. Thamir A. Hamdan
Department of Surgery, University of Basrah
College of Medicine, Basrah; IRAQ.

The aetiology of low back pain

Precise identification of the underlying cause of back pain is very vital for the eradication of pain, this can be achieved by the combination of identifying the pathological process (like inflammatory, neoplastic, degenerative, metabolic, traumatic, infective) and the anatomical structure involved (like myopathic, neuropathic, osteopathic, arthropathic, or ligomentopathic). We can reach this goal by getting a proper history, and physical examination followed by perfect investigation. However, there are many classifications for low back pain, for example, Macnab [2] classify low back pain into: Viscerogenic, Neurogenic, Spondylogenic and Psychogenic back pain.

Jayson classify back pain into[3,4]:
A) Primary back pain which include: i) cutaneous and subcutaneous, ii)myo-fascial (muscle and fascia) both may be affected by trauma, spasm, fatigue and inflammation. iii) articular and ligamentous, which include: Apophyseal and sacroiliac joints and Spinal ligaments. iv) osseous (vertebral and sacral), which

include: Intervertebral and Periosteal. v)vascular and vi)Dural

B)Secondary backache which is either due to compressive or degenerative lesions

C)Referred backache from: gynecological, urinary tract, prostate and appendix

D)Psychosomatic backache: depression and anxiety, hysteria and malingering.

Mennell [5] mentioned that back pain may arise from local pain, referred pain (pain referred to the spine and pain of spine origin referred to the leg or buttocks), radicular pain and muscular spasm.

Finneson[6] gave a detailed list of causes of low back pain but without classifcation.

However, it is very difficult to gather the vast numbers of causes of low back pain under one umbrella.

We suggest the following classification for low back pain, because we feel it is easy to remember and cover to some extent a wide range of causes. Back pain may arise from spondylogenic, non-spondylogenic and non-specific causes.

A-Spondylogenic causes

Spondylogenic back pain may be defined as: pain derived from the spinal column and its associated structure. The pain is aggravated by general and specific activities and is relieved to some extent, by recumbency. In spondylogenic pain, the diagnosis may be reached by history of spine problem like degenerative changes, previous similar condition or trauma to the spine.

The pain is usually severe, and acute in nature, well localised, improve to some extent by rest and get worse by exercise and activity, that puts the spine in action. There may be associated tender spot in the back, and the associated radiculopathy support this diagnosis. Investigations usually prove that the pathological process is located in the spinal column or its related structure.

The pain may be derived from lesions involving the bony components of the spinal column, from changes in sacroiliac joints, or most commonly, from changes occurring in the soft tissues [7].

Spondylogenic lesions constitute the most common source of low back pain seen in clinical practice. The pathological changes are usually due to: trauma, infection, neoplastic, metabolic, congenital anomalies and degenerative causes.

Pain of spine origin may be referred to the buttocks and legs. Disease affecting the upper lumbar spine may refer pain to the lumbar region, or anterior thigh, while disease affecting the lower lumbar spine may result in pain referred to the buttocks, posterior thighs or rarely the calves or feet.

Classic radicular pain is usually sharp and radiates from the spine to the leg within the territory of a nerve root. Coughing, sneezing or voluntary contraction of abdominal muscles (lifting heavy objects or straining at stool) often elicits radiating pain.

The pain associated with muscle spasm, although of obscure origin, is commonly associated with many spine disorders.

Spondyloginc back pain result usually from mechanical or chemical irritation of the nociceptive receptor nerve endings embedded in the various lumbosacral tissues. In this situation, then, the pain is experienced by the patient, with varying degree of precision, in those tissue within which the pathological disturbance, whether mechanical or chemical or both, is operating; and within this category further subdivision is possible in terms of the particular

tissues containing the irritated nociceptive nerve ending.

B-Non-Spndylogenic low back pain

The origin of pain is usually located outside the anatomical structure of the spinal column and its related structure. The pain is either referred to the back and there are no structured changes in the anatomy of the back or there is some sort of changes in the anatomical structure of the back which is usually secondary or compensatory changes. Also the back may be involved by a systemic process that involves almost every part of the body, which is usually associated with some established anatomical and pathological changes in the back structures.

The patient describes, feels, and believes that the pain is located in his back, and on so many occasions it is not easy to change this feeling.

The pain is usually dull aching in nature, located in one side of the back, usually not very severe, and poorly localised. Rarely it is sudden and excruciating and spread to the buttocks and legs as in dissecting aneurysm of the aorta.

Usually there is no history suggestive of spinal disorder but history of the underlying condition, other characteristics of the pain may provide clue to its origin: for example, backache due to peptic ulcer may be induced after ingestion of an orange, alcohol or coffee and relieved by food and antacids. Fatty foods are more likely to induce back pain associated with biliory disease. Malposition of the uterus may lead to sacral pain after standing for several hours. There are no abnormal physical findings in the back unless there is secondary structural changes. There may be some singe or symptoms related to the underlying pathology like urinary, gastero intestinal, gynecological or vascular manifestations.

On some occasions the pathological process is obviously manifested outside the spinal column and investigation usually prove that the lesion is primarily non-spondylogenic in origin. Constitutional and systemic disturbance usually supports the diagnosis of non-spondylogenic back pain.

Non-spondylogenic back pain may be the first obvious presentation of a hidden flame, like a retroperitoneal sarcoma or a retroverted uterus, and usually improve after treating the suspected non-spodylogenic pathology.

The pain arises usually from tissue or organ whose innervation is segmentally related to that of the superficial tissues of the lumbosacral region, and this variety constitutes referred backache with no structural changes in the back.

So, non-spondylogenic back pain can be classified into two categories:

A- Non spondylogenic back pain without structural changes in the back which consist of referred pain and psychosomatico disorders.

B- Non-spondylogenic back pain with secondary structured changes in the spinal column or its related structure which may arise because of a systemic disease or a localised pathology away from the spine.

C-Non-specific causes of low back pain

This term covers a residual groups in whom no clear diagnosis could be made despite a thorough clinical evaluation and investigation, but some of them at a later follow up can be include into the spondylogenic or non-spondylogenic low back pain.

Analytic study of the non-spondylo-genic low back pain

A-Non-spondylogenic backache without structural changes in the back which includes referred pain and psychosomatic pain. Referred pain may arise from:

1- *Viscerogenic causes:*

The gastero intestinal tract may give rise to a considerable percentage of back pain, this is related to inflammatory process like pancreatitis, retro caecal appendicitis. In duodenal ulcer, backache may indicate an early perforation of a duodenal ulcer posteriorly located. Neoplastic disorder like carcinoma of the pancreas, stomach or colon may cause backache even in its early stages. Abdominal and back pain may occur at the same time, if the level of abdominal and back pain is the same, the pathology will probably be found in the abdomen, whereas if the level of abdominal pain is lower than the level of back pain, the pathology is probably in the back, this is because the segmental nerve distribution in the lower half of the body courses caudally from its spinal cord segment [7]. Sigmoid colon disease may refer pain to the upper sacral region, midline, suprapubic region or left lower quadrant of the abdomen. Disease of the pancreas may cause back pain to the right side of the spine if the head of pancreas is involved or to the left if the body or tail are involved[8].

In clinical practice, referred low back pain is encountered most frequently in gynecological context, the common example being dysmenorrhea which occur in approximately 10-20 percent of females[6]. This pain often described as bearing down, a sensation of heaviness, in which low back pain may occur with or less often without accompanying suprapubic pain immediately before and on the first one or two days of each menstrual period. Low back pain is influenced by the use of oral contraceptive and many doctors advise women with low back pain to avoid oral contraceptive, but Brynhildsen et al did not support this hypothesis [9]. As the nociceptive innervation of the uterus is largely confined to the lining of the cervix, the referred backache is generated by distension of this structure, a fact illustrated also by the backache produced by surgical dilation of the cervix in unanesthetised patients and by the initial cervical dilation at the onset (i.e. first stage) of labour [6]. Pain may be referred to the back in women with lesions of: the ovaries or fallopian tubes, as in salpingitis and ectopic pregnancy, with uterine prolapse, or retroversion, especially when associated with myomatosis, or with carcinoma of the uterine cervix, for which reasons a detailed gynecological history and investigation is an essential part of examination of any woman with non-traumatic low back pain [4].

Periodicity of back pain and its relation to the menstrual cycle may suggest a gynecological cause. Haematocolpos was also reported as a cause of low back pain[10].

Patients with upper urinary tract diseases frequently present with referred backache as one of their symptomatic feature. This is particularly the case with pyelitis, pyelonephritis, and in patients with renal calculi; but back pain may also be associated with hydronephrosis or neoplastic lesions that involve the renal pelvis.

In men the various forms of prostatites, especially if chronic provide the principal cause of referred low back pain, but it may also occur in a small proportion of patients with prostatic carcinoma. However, pain referred from the prostate is usually experienced in the sacral rather than in the lumbar region, the later being the usual site of reference of pain of renal origin.

Backache is rarely the sole symptom of visceral disease. Careful questioning will usually elicit other symptoms. The history of viscerogenic back pain can be differentiated from a back pain derived

from disorders of the spinal column by one important feature. The pain is not aggravated by activity nor is relieved by rest. Indeed, with severe pain the patient whose symptoms are visceral in origin will move around to get relief, whereas the patient suffering from septic discitis will lie perfectly still[2]. Pelvis tumors, particularly those within the retro peritoneal space, may cause irritation and compression of the lumbo sacral plexus and be productive of low back pain and sciatica.

Occasionally, endometriosis may actually invade the lumbar and sciatic plexus or the sciatic nerve itself producing severe hip and sciatic pain.

2-Vascular back pain:

Aneurysm or peripheral vascular disease may give rise to backache or symptoms resembling sciatica. Abdominal aneurysms may present as a boring type of deep seated lumbar pain unrelated to activity.

Insufficiency of the superior gluteal artery may give rise to buttock pain of a claudicant character, aggravated by walking, relieved by standing still[2].

Thrombosis of terminal aorta may be the cause of lumbar pain, while occlusion of the common iliac or internal iliac artery may produce low back pain, and hip pain. Compression of the lumbo sacral plexus by an aneurysm of the common iliac artery is a rare cause of sciatica.

A dissection aneurysm of the aorta may produce, as its initial symptoms excruciating low back pain which spreads into the buttocks and legs[6]. The diagnosis of vascular low back pain is usually associated with other manifestation of vascular insufficiency.

A significant association is indicated between atheromatous lesions in the abdominal aorta and low back pain[11]. Yabuki reported improvement in two cases of low back pain after vascular reconstruction for arterio sclerosis obliterans in the abdominal cavity, it is suggested that one factor leading to low back pain might be various degrees of ischemia of the extensor muscles in the lumbar spine[12]. The sudden appearance of obscure lumbar pain in patient receiving anticoagulants should arouse the suspicion of retroperitoneal bleeding[13].

3- Neurogenic back pain:

Lesion of the central nervous system such as thalamic tumor may present or develop a causalgic type of leg and back pain. Entrapment neuropathy of the sciatic nerve is extremely rare. The priformis syndrome may occur when the nerve is tightened against the greater sciatic notch by hip flexion posture with compensatory lordosis [6].

Probably the most frequent cause of sciatic nerve trauma is an inadvertently placed intra muscular injection in the buttock with the needle situated too low too middle, also sciatic nerve trauma may occur from posterior dislocation of the femur. Occasionally a fall in sitting position on a hard projecting object will traumatize the nerve[6]. This sudden trauma may not only cause direct injury to the nerve but also may impinge the nerve against the sharp edge of the sciatic notch.

Primary or idiopathic sciatica is another extremely rare condition. Tumors involving the sciatic nerve in form of neurofibroma or neurolimoma is another site of confusion because the lesion is hidden by the thick group of muscle in the gluteal region or in the lower limb. Also there are though very rare, reported cases of secondaries in the sciatic nerve[6].

Entrapment neuropathy of the obturator nerve, iliohypogastric and ilioinguinal neuritis may share on rare occasion in the production of non-spondylogenic back pain.

Very severe backache may be an early feature of the acute stage of anterior poliomyelitis. Backache is a common feature of subarachnoid haemorrhage originating in one of the branches of the circle of willis.

4-Greater trochantric and iliac crest pain syndrome:

Trochantric bursitis and iliac crest pain may present in a considerable percentage of all patients with low back pain and they are easy to differentiate clinically from patients with other form of low back pain[3,14,15].

5-Hip problems particularly osteo-arthritis of the hip may lead to low back pain, diagnosis can be easily reached on clinical and investigation basis. It leads to a dull intermittent unilateral recurrent low back pain. Findings of the excessive hip lateral rotation and excessive foot pronation on the same side of low back pain suggested a possible connection between low back pain symptom, hip and lower extremity dysfunction[16].

6-Psychosomatic backache:

In this group the complication of pain in the back is entirely of psychological origin and is not related to any structural or function changes in the tissue of back, and therefore is imaginary or unreal.

Stressful life events that arouse feeling of helplessness may contribute to the development of chronic idiopathic low back pain. Psychosocial help in this condition will help to reduce or abolish back pain[17].

A purely psychologically induced back pain, however, is not nearly so common, but the clouding and confusion of the clinical picture by emotional over tones are very commonly seen, and can be considered as psychogenic magnification of pain [9].

Although the physician must learn to recognize the presence of an emotional break down, he must never forget that emotional illnesses do not protect a patient against organic diseases, so the physician must be prepared to accept the possibility of an underlying significant pathological process and investigate its probability thoroughly. Psychosomatic backache may occur in patient with anxious depression which is the outcome of persistent hyperactivity of motor units in various muscle groups even when apparently at rest [18]. Or in hysteria, which is basically a hysterical reaction to a relatively trivial traumatic or mechanical disorder of the muscular ligamentous or articular tissues of the back, or due to some personal emotional or financial advantage to the sufferer[4].

A malingerer may use back pain as a route for compensation or to escape from an unwanted or difficult situation. He is lying when he complains of low back pain, in that he is not experiencing or has not experienced such pain although he says that. This situation is encountered relatively frequently in medico legal circumstances. A detailed interrogation and examination of the patient will be alerted to the possibility of maligering by the discrepancy between his complaints and the clinical findings. The spinoscope (non-invasive imaging system) which gives measure relevant functional parameters, and provide objective documentation of function may be of immense help in this matter [19].

6-Prockalgia fugax

May lead to intense pain felt deep to the sacrum and coccyx, it is more common in the male. It usually awakes the patient in the early hours of the morning may be prolonged by straining at stool, sitting on a hard seat or coitus, in which case it follows ejaculation. It is probably due to spasm of a portion of the levator ani, but spasm of the recto pelvic junction is favoured by some writers.

B-Non-spondylogenic low back pain with secondary structural changes in the back

Backache is very common problem during pregnancy particularly during the end of pregnancy[20,21]. Women with severe low back pain during pregnancy have an extermely high risk for experiencing a new episode of severe low back pain during another pregnancy[22]. During the later half of pregnancy there is generalised softening of the fibrous tissue structures in the lumbo sacral spine and pelvis, attributed to hormonal effect, which produce some tissue laxity, this is in addition to the increased mechanical demands on the back by the foetus and the gravid uterus.

The most severe problems are usually in multiparas who have had a diastases during a previous pregnancy [23]. Laxity of the abdominal muscle, which is a flexor muscle of the back may lead to extra burden on the back pain, and secondary muscular and joint changes which lead to back pain[6].

Generalised laxity which is part of the hypermobility syndrome may also lead to some sort of back pain[24].

Mechanical derangement in the lower extremity in form of congenital or acquired anomalies or some sort of shortening will certainly lead to low back pain with compensatory changes in the back structure. Correction of these anomalies may lead to cure of back pain.

Rossvoll reported improvement of low back pain after osteotomy for leg length inequality[25].

Tight hamstring muscle due to shortening of semitendinosus and semi membranous muscle rebounds on hip biomechanics and on the muscle kinematics chain leading to low back pain, lengthening of the contorted hamstring is necessary to cure back pain[26].

Taut illiotibial band lead to chronic subluxation of the sacroiliac joint, with secondary compensation, pain may be present in the back or in either iliac fossa suggesting visceral disease [5].

Almost always there is insufficiency of the Achilles tendon associated with taut illiotibial bands, and if uncorrected, prevents the success of otherwise suitable treatment of low back pain.

Systemic disease like rheumatoid arthritis, systemic lupus erythymatosis, tertiary syphilis, gouty arthritis, hormonal imbalance, ochronosis, blood dyscrasia like leukaemia and sickle cell disease may give rise to some sort of low back pain at some stage of the disease which is usually due to temporary or permanent structural changes in the vertebral column or its related structure.

Electrolyte imbalance due to sodium chloride loss by excessive sweating occur in hot weather in laborers and manual workers, i.e. stoker's cramps due to changes in muscle metabolism may lead to back pain due to muscle cramps[5].

In large number of febrile illness severe backache occurs, which is probably due to temporary structural changes in the muscle of the back. They are usually immediately recognizable on account of the constitutional disturbances associated with the disease causing the fever, e.g. influenza, brucellosis and typhoid fever.

Chronic infection of the adenoids and upper respiratory tract may act as a secondary aggravating factors. A focal infection is capable of initiating clinical symptoms in dormant mechanical lesions, making it impossible to obtain relief by mechanical measures until infectious factor has been eliminated[28].

Remarks

The precise diagnosis of low back pain is always mandatory before starting the appropriate line of treatment, because back pain is a syndrome rather than a disease. To achieve this goal, a precise and comprehensive history with proper and thorough physical examination of the body as whole followed by a well

planned investigation will help in reaching the accurate destination. Symptomatic treatment as a temporary measure is needed in the initial stages but it should be followed very soon by the definitive treatment that should hit and hopefully eradicate the target.

The definitive treatment which consist of conservative, psychotherapy, or operative treatment should be directed to the underlying hidden or obvious pathology and to the aggravating factor.

Conclusion

A careful search for the causes of low back pain which is really a symptom rather than a disease is probably much more important than the symptomatic treatment. Lumbar back pain may be the first manifestation of a hidden and serious flame inside the body, and may not always be located in the vertebral columns or its related structures. Failure to recognize this fact and to recognize the rare and hidden causes for low back pain may lead to prolonged, unnecessary and probably a serious suffering of the patient and the treating physician. Therefore it is always necessary to remember the non spondylogenic causes of low back pain first.

References

1. Edward M. Hanley Jr. Orthopaedic knowledge update 5. 1st edition. Lumbar degenerative disease, Ch.50, p.609, American Academy of Orthopaedic Surgeon 1996.
2. Macnab Ian. Backache, chap. 9, page: 167, 148, 297, 221. The Williams and Wilkins Co. Baltimore 1977.
3. Collee G, Dijkmans B.A., Vandenbrouke J.P., Cats A. Iliac crest pain syndrome in low back pain. A double blind-randomized study of local injection therapy. J Rheumatol 1991; 18(7): 1060-3.
4. Jayson Malcolm I.V., Allan St J Dixon. The lumbar spine and back pain. Second eddition, Pitman Medical 1980, Chap.5, 11, page: 295,150.
5. Mennell John Mc M. Back pain, diagnosis treatment using manipulative technique. Chap.10, page: 151, 154,167. Little, Brown and Company, 1960.
6. Finnenson Bernard E. Low back pain, chap.15, page 323-342. J. B. Lippincott Company, 1973.
7. Hodge JC, Bessette B. The incidence of sacroiliac joint disease in patients with low back pain. Can Assoc Radiol J 1999; 50(5): 321-3.
8. Splenger Dan M. Low back pain assessment and management. Chap.5, page 63. Grune and Stratton 1982.
9. Brynhildosn J, Hammar J, Hammar ML. Does the menstrual cycle and use of oral contraceptive influence the risk of low back pain. A prospective study among female soccer players. Scand J Med Sci Sports 1997; 7(6): 348-53.
10. Harrison C.S. Hematocolpos as a cause of low back pain, a case report. Spine 1991; 16(8); 985-986.
11. Kurnlahti M, Tervonen O, Vanharanta H, Ilkko E, Suramo I. Association of arthrosclerocic with low back pain and the degree of disc degeneration. Spine 1999; 24(20): 2080-4.
12. Yabuki S, Kikuchi S, Midorikawa H, Hoshino S. Vascular backache and consideration of its pathomechanism report of two cases. J Spinal Disord 1999; 12(2): 162-7.
13. John W. Engstorm, David Bradford. Harison's principle of internal medicine. Vol.1, chap.16, page 73-79, International Edition 1998, 14th edition.
14. Collee G, Dijkmans B.A., Vandenbrouke J.P., Cats A. Greater trochanteric pain syndrome (Trochanteric bursitis) in low back pain. Scand J Rheumatol 1991; 20(4): 262-6.
15. Collee G, Dijkmans B.A., Vandenbrouke J.P., Cats A. Iliac crest pain syndrome in low back pain. J Rheumatol 1991; 18(7): 1064-7.
16. Cibulka M.T. Law back pain and its relation to the hip and foot. J Ortho Sport Phys Ther 1999; 29(10): 595-601.
17. Lampe A, Sollner W, Krismer M, Rumpold G, Kantner-Rumplmair W, Ogon M, Ruthner G. The impact of stressful life events on exacerbation of chronic low back pain. J Psychosom Res 1998; 4(5): 555-63.
18. Sivik TM. Personality traits in patient with acute low

back pain. Psychother Psychosom 1991; 65(3): 135-40.
19.Mcllwain W.A. Clinical application of the spinoscope. Bristol regional medical centre, Bristol, Tennessee, (Spine x), 1993.
20.McIntvre IN, Broadhurst NA. Effective treatment of low back pain in pregnancy. Aust Fam Physician 1998; 25(9 suppl 2): 565-7.
21.Perkins J, Hammer RL, Loubert AV. Identification and management of pregnancy related low back pain. J Nurse Midwifery 1998; 43(5): 331-40.
22.Brynhildosn J, Hansson A, Persson A, Hammar M. Follow up of patients with low back pain during pregnancy. Obstet Gynaecl 1998; 91(2): 182-6.
23.Dalv JM, Frame PS, Rapoza PA. Sacroiliac subluxation: a common treatable cause of low back pain in pregnancy. Fam Pract Res J 1991; 11(2): 149-59.
24Konrad K. Joint hypermobility. Frequent cause of low back pain. Orv Hetil 1998; 28.137(30): 1643-6.
25.Rossvoll I, S. Junk, and T. Terjessen. The effect on law back pain of shortening osteotomy for leg length inequality. International Orthopaedic (SICOT) 1992; 16: 4,388-39.
26.Angles, F.G., Manubens X.B., Angles F.C. Surgical technique for lengthening tight hamstring muscles in patients with law back pain. International Orthopaedics (SICOT) 1997; 21: 1, 52-53.
27.Weiss D.J., Conliffe T, Tatta N. Low back pain caused by a duodenal ulcer. Arch Physical Medicine Rehabil, 1998; 79(9):1137-9.
28.Williams Paul C. The lumbo sacral spine. Chap.5, page 43-44. The Blackiston Division, McGraw-Hill Book Company 1965.