

## Review Article

# Analysis of Potential Etiology in Patients with Nonoperative Spinal Infections: A Single-Center Retrospective Analysis

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Submitted: 30 July 2024

Accepted: 30 August 2024

Published: 02 September 2024

ISSN: 2578-3181

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**Keywords**

- Nonoperative Spinal Infections
- Potential Etiology
- Senility
- Dysdefecation
- Sleep Disorder

**Abstract**

**Objective:** To prevent and reduce the risk of spinal infections by analyzing the underlying causes of non-operative spinal infections.

**Methods:** By analyzing the case data of 69 patients with non-operative spinal infection in our hospital from 2019 to 2024, the potential etiology of non-operative spinal infection was sought and analyzed.

**Results:** 1) 69 patients with non-operative spinal infection, 35 males and 34 females, with an average age of 63.55 years; among them, 45 cases (65.22%) were over 60 years old. 6 cases (8.69%) were younger than 36 years old. There were 18 cases (26.09%) in middle-aged people aged between 36 and 59.

2) Among the 69 patients, 25 (36.23%) were urban residents; There were 44 people living in rural areas, accounting for 63.77%.

3) Among the 69 patients with non-operative spinal infection, 48 (69.57%) were complicated with sleep disorders, of which 14 slept less than 4 hours per night and 34 slept 4-6 hours per night; 21 people (30.43%) slept 6 hours a night.

4) Among 69 patients with non-operative spinal infection, 47 had abnormal defecation, accounting for 68.12%, 40 had constipation, 7 had diarrhea, and 22 had normal defecation, accounting for 31.88%.

5) Among the 69 patients, there were 16 patients with hypertension, 16 patients with diabetes, 13 patients with pulmonary diseases, 12 patients with more than one year's history of surgery at non-infected sites, 10 patients with heart disease, 10 patients with tumor, 7 patients with autoimmune diseases (including rheumatoid arthritis, ankylosing spondylitis, and Berce's disease), 8 patients with drinking history, and 6 patients with smoking history. Other diseases (including cerebrovascular diseases, liver diseases, kidney diseases, osteoporosis, etc.) 15 patients.

6) The number of affected vertebrae in 69 patients with non-operative spinal infection was 93 in the lumbar spine, 49 in the thoracic spine and 10 in the cervical spine, accounting for 61.18%, 32.24% and 6.58%, respectively. The affected vertebrae of lumbar spine were L3 (15.13%), L4 (14.47%), L2 (12.50%), L5 (11.18%), L1 (7.89%). The affected vertebrae of the thoracic vertebrae were mainly concentrated in T8-T12, with T9 (5.92%), T11 (5.26%), T12 (5.26%), T10 (4.60%), and T8 (3.29%) in descending order. There were fewer affected vertebrae in the cervical spine, mainly concentrated in C4-C6, C5 (1.97%), C6 (1.32%), C4 (1.32%) from most to least affected.

**Conclusion:** This article briefly describes the relationship between aging (advanced age), sleep disorders (insomnia), defecation disorders (intestinal flora disorders) and non-operative spinal infection. Advanced age, insomnia, and abnormal bowel movements may be potential causes of non-operative spinal infections.

**INTRODUCTION**

The Huang Di Nei Jing says, "The wise doctor can detect the end of the disease before it occurs and intervene to prevent it from becoming worse. When the development of the disease presents certain symptoms, the doctor of the middle level dialectical (and or) disease treatment, the disease control and cure in time; Low-level doctors often find the end of the disease when there is a series of signs or symptoms of discomfort, and administer medicine and rescue treatment for the disease". "Not

sick, be going to be sick, already sick" are three different stages of disease occurrence. With the continuous development of the idea of preventive treatment of disease in TCM, people pay more and more attention to prevention than treatment. Spinal infection, including vertebral body infection, discitis and paravertebral abscess [1], is a common clinical disease that seriously affects the stability of the spine. The diagnosis of pathogenic bacteria is difficult, which often brings serious challenges to the treatment of clinicians. Common causes of spinal infections include infection of the surgical site, tuberculosis, brucella, and other specific

bacteria. The incidence of infection after spinal surgery ranges from 0.5% to 18% [2]. A study of 14,948 spinal surgery patients in a hospital found that 139 cases of postoperative surgical site infection occurred, with an incidence of 0.93% [3]. Spinal tuberculosis is also the most common type of bone tuberculosis, accounting for about 50% of patients with bone tuberculosis [4]. The proportion of spinal infection caused by brucella infection in brucellosis complications can be as high as 53% [5]. In short, no matter what the cause of spinal infection is fatal to the human body. Once a spinal infection occurs, severe cases can be life threatening and mild cases can require months or even years of treatment. Therefore, it is important to actively look for the potential causes and risk factors for spinal infections to reduce or reduce the occurrence of spinal infections. At present, most of the research is focused on the precise diagnosis and medication treatment of spinal infections, and there are few studies on the underlying causes of spinal infections. Through retrospective analysis of the data of patients admitted to our hospital and diagnosed with non-operative spinal infection in the past five years, this study hopes to find the potential causes and risk factors leading to spinal infection, so as to better prevent spinal infection and achieve the purpose of "prevention before disease".

## MATERIALS AND METHODS

A total of 69 patients who were hospitalized in our hospital from 2019 to 2024 and diagnosed with nonsurgical spinal infections were selected. All hospitalization data and materials of patients were collected. Patients who were repeatedly hospitalized due to diseases were counted as one patient, and the data were entered and analyzed according to the first diagnosis and treatment. Basic data were collected, sorted out and analyzed for all patients. Include age, sex, occupation, place of residence, sleep status, bowel movements, co-existing underlying diseases and relevant laboratory tests (including C-reactive protein, erythrocyte sedimentation rate, leukocytes, neutrophils, lymphocytes, red blood cells, hemoglobin, total protein, albumin, prealbumin). All data were analyzed using SPSS.

## RESULTS

### Basic Information of the Patients

69 patients with non-operative spinal infection, including 35 males and 34 females, with an average age of 63.55 years; among them, 45 cases (65.22%) were over 60 years old. 6 cases (8.69%) were younger than 36 years old. There were 18 cases (26.09%) in middle-aged people aged between 36 and 59. Among the 69 patients with non-operative spinal infection, 25 (36.23%) were urban residents. There were 44 people living in rural areas, accounting for 63.77% (Table 1).

**Table 1:** The basic situation of patients with non-operative spinal infection by gender, age and place of residence.

Gender	Age	t value	P value	Place of Residence		X <sup>2</sup> value	P value
				Urban	Rural		
Male(35)	62.51 ± 16.162	0.594	0.555	11	24	0.709	0.400
Female(34)	64.62 ± 13.036			14	20		

## Observation Indicators

1) Among the 69 patients with non-operative spinal infection, 48 (69.57%) were complicated with sleep disorders, of which 14 slept less than 4 hours per night and 34 slept 4-6 hours per night; 21 people (30.43%) slept 6 hours a night (Table 2), There were significant differences in sleep disorders among patients of different ages, which had statistical significance.

2) Among 69 patients with non-operative spinal infection, 47 had abnormal defecation, accounting for 68.12%, 40 had constipation, 7 had diarrhea, and 22 had normal defecation, accounting for 31.88% (Table 2). Defecation disorder was found in patients of different ages, which was statistically significant.

3) Among the 69 patients, there were 16 patients with hypertension, 16 patients with diabetes, 13 patients with pulmonary disease, 12 patients with more than one year's history of surgery on non-infected sites, 10 patients with heart disease, 10 patients with tumor, 7 patients with autoimmune diseases (including rheumatoid arthritis, ankylosing spondylitis, Behset's disease, etc.), 8 patients with drinking history, and 6 patients with smoking history. Other diseases (including cerebrovascular diseases, liver diseases, kidney diseases, osteoporosis, etc.) 15 patients.

4) There were 93 affected vertebrae in the lumbar spine, 49 in the thoracic spine and 10 in the cervical spine, accounting for 61.18%, 32.24% and 6.58%, respectively. The affected vertebrae of lumbar spine were L3 (15.13%), L4 (14.47%), L2 (12.50%), L5 (11.18%), L1 (7.89%). The affected vertebrae of the thoracic vertebrae were mainly concentrated in T8-T12, with T9 (5.92%), T11 (5.26%), T12 (5.26%), T10 (4.60%), and T8 (3.29%) in descending order. There were fewer affected vertebrae in the cervical spine, mainly concentrated in C4-C6, C5 (1.97%), C6 (1.32%), C4 (1.32%) from most to least affected.

## DISCUSSION

Through data review and analysis, it can be seen that there are many potential causes of non-surgical spinal infection, and even many unexplained spinal infection is the first and single symptom. However, patients with non-surgical spinal infection present old age, sleep disorders, defecation disorders, many basic diseases, and living in rural areas. It is speculated that old age, sleep disturbance, bowel disturbance, many underlying diseases, and living in rural areas may be the potential risk factors or causes of non-surgical spinal infection. Chinese medicine believes that "the existence of positive qi and evil qi in the body can not invade the body and cause disease". Old age, sleep disorders, defecation

**Table 2:** Age and sleep and bowel movements in patients with nonoperative spinal infections.

Age	Sleep Condition		X <sup>2</sup> value	P value	Defecation		X <sup>2</sup> value	P value
	Normal	Obstacles			Normal	Obstacles		
≥ 60 Age (45 people)	8	37	9.789	0.002	10	35	5.561	0.018
< 60 Age(24)	13	11			12	12		

disorders, basic diseases can cause deficiency of healthy qi, rural living environment is more susceptible to infection of evil qi.

### Aging and Infection

The Huang Di Nei Jing says “Kidney qi begins to fill up gradually, teeth begin to change from baby teeth to permanent teeth, and hair gradually darkens.....After the age of 49, Ren pulse deficiency, less Taichong pulse failure, Tiangui exhaustion, tunnel impassability”. “The husband is eight years old, his kidneys are full, his hair has grown and his teeth have been replaced. At the age of 64, Tideci exhaustion, less sperm, kidney failure, the teeth are less and less, and the body is the same.....”. The since ancient China began to pay attention to the influence of age on the body, with the increase of age, the body’s organs are exhausted and various functions decline. Modern research has found that with the increase of age, the body’s immunity declines, and immune aging occurs. Immune aging can cause the elderly to have impaired response to infection when exposed to pathogens, and develop autoimmune diseases and chronic non-immune diseases, including cardiovascular and neurodegenerative diseases, cancer, autoimmune diseases, COVID-19, etc., so there are more age-related diseases in the elderly [6-9]. summarized the contribution of viral and bacterial infections to aging and immune aging, and found that many RNA viruses (novel coronavirus, hepatitis C virus, HIV, Infections caused by measles viruses, dengue viruses, certain influenza A viruses), DNA viruses (herpes virus Kaposi sarcoma virus, Epstein-Barr virus, hepatitis B virus, Merkel cell polyomavirus), bacteria, etc., are all associated with aging. There is a two-way link between infection and aging. By participating in various processes of the immune system, aging affects a variety of antibacterial functions in the host body, increases the sensitivity of the elderly to different pathogens, induces inflammation or aggravates the original inflammatory response. In turn, bacterial infections can induce aging through a sustained inflammatory response.

The first signs of weakened immunity appear after the age of 50, and clinical relevance increases between the ages of 70 and 100, along with increased morbidity and mortality from infection [10]. The study found [8-12] that older adults are more susceptible to new infections and reactivation of latent viruses. and because aging cells make older people more susceptible to infections, cancer and other diseases, they are less protective against vaccines. These may be related to decreased B cell and T cell responses with age. B-cell aging not only leads to a decreased antibody response to new pathogens, but also leads to an increase in the prevalence of autoimmunity with age [13]. There are also gender differences in the epidemiology, pathophysiology, symptoms and severity of age-related diseases [14].

In addition, age-related body changes were also associated with changes in gut flora. Many elderly people’s nutritional changes lead to changes in intestinal flora and age-related immune capacity. The imbalance of intestinal flora can also promote the occurrence of low-grade inflammation. We will introduce the relationship between intestinal flora and inflammation and

infection later. The elderly also experience normal age-related changes in sleep and circadian rhythm, with significant sleep disorders [15]. We will also introduce the relationship between sleep disorders and inflammation and infection later.

In this retrospective analysis, we found that 65.22% of the elderly over 60 years old suffered from non-operative spinal infection, and 10 of them were over 80 years old, accounting for 14.50%. It is speculated that advanced age may be a potential cause and risk factor for non-operative spinal infection.

### Defecation Disturbance and Infection

Statistics show that functional constipation in adults in the United States, Canada and the United Kingdom is 7.9% to 8.6% [16]. A survey of Chinese people found that the prevalence of chronic constipation was positively proportional to age, with 13-18% for those over 60 years old and 37.3% for those over 80 years old [17]. Clinical findings indicate that intestinal flora imbalance is closely related to functional constipation, and there are characteristic changes in intestinal flora in patients with functional constipation [18]. For example, in patients with functional constipation, the abundance of intestinal probiotics (such as bifidobacterium and Lactobacillus) decreased, the abundance of desulphurvibrio family (whose product H<sub>2</sub>S inhibits colon movement and promotes inflammation) increased, and the abundance of butyricogenes (butyric acid maintains intestinal barrier integrity, prevents bacterial endotoxins and inflammatory reactions, and reduces interference with intestinal movement) increased.

Animal experiments have found that [19] constipation leads to intestinal flora imbalance, resulting in increased permeability of the intestinal barrier and blood-brain barrier, damage to the integrity and function of the intestinal barrier, imbalance of T cell subsets and disturbance of cytokines, and further lead to uncontrolled passage of bacterial components, bacterial metabolites and harmful substances through the intestinal barrier, causing systemic inflammation. Studies have found that intestinal microbiota disorders are associated with the development and severity of a growing number of diseases, such as Inflammatory Bowel Disease (IBD), autoimmune diseases, obesity, metabolic diseases, and neurological disorders. The intestinal microbiota is not only involved in maintaining the integrity of the intestinal epithelial barrier, resisting exogenous pathogens, the maturation of the host intestinal immune system, the metabolism of foreign organisms and the influence of distant organs outside the intestine. Moreover, it acts as an endocrine organ, influencing satiety regulation, hormone regulation, human mood and behavior, and the interaction between the gut microbiota and the brain is known as the “gut-brain axis” [20]. The microbial-gut-brain axis is directly or indirectly involved in the regulation of sleep behavior and may play a key role in the etiology and pathogenesis of sleep disorders [21]. We will discuss the relationship between sleep disorders and gut microbiota in a later section.

Intestinal microbes not only form the “gut brain axis”, but also the “gut liver axis” and “gut lung axis”. Enterohepatic axis refers to the effects of intestinal flora, microbial metabolites, and interactions with the immune system on different liver diseases [20]. “Enteropulmonary axis” refers to the interaction between intestinal flora and lung flora. When intestinal flora is destroyed, the ecological balance of lung flora may also change accordingly, resulting in lung infection [22].

According to traditional Chinese medicine, there are certain aspects of the function of the lung and the large intestine that are the same. This is consistent with a lot of modern research. Studies have found that elderly patients with influenza [23] and children with sepsis [24] both have significant intestinal flora imbalance, while type 2 diabetes patients with intestinal flora imbalance in late pregnancy lead to an increase in neonatal lung infection rate [25]. The mechanism may be considered that intestinal microbes are involved in regulating intestinal immune response and endotoxin levels, as well as T cell activity and immune response of pulmonary respiratory epithelial cells, thus leading to the imbalance of lung flora and causing lung infection.

To sum up, the gut is not only a digestive organ, but also an immune organ with immune regulation function and a “second brain” affecting brain function, all due to the presence and regulation of intestinal flora [26]. Bowel disorders directly affect the gut microbiota. Intestinal microbiome, abundance of blood metabolites and lifestyle factors are different in different types of defecation disorders [27]. Increased permeability of the intestinal barrier may lead to the entry of bacteria and their metabolites into the blood circulation, resulting in systemic infection.

### Sleep Disorders and Infection

Sleep plays an important role in regulating adaptive and innate immune responses. There is evidence that sleep disorders lead to downregulation of adaptive immunity, manifested by impaired response to infectious challenges, and up-regulation of innate immune responses, manifested by increased cellular and genomic markers of inflammation [28]. The survey shows that nearly 25% of the population in the United States suffers from insomnia, and the prevalence of sleep insomnia among the elderly in China is slightly lower, ranging from 12% to 20% [29]. Sleep disturbances weaken adaptive immunity; therefore, the vaccine response and antiviral immune response are weakened, and the susceptibility to infectious diseases is increased. Sleep disorders are associated with inflammatory diseases such as rheumatoid arthritis and heart failure by increasing C-reactive protein, interleukin-6, interleukin-1 $\beta$ , and tumor necrosis factor, reducing the activity of natural killer cells, and triggering immune responses. Habitual sleep duration decreased (e.g. < 5 hours) and prolonged (e.g. > 9 hours) is associated with an increased risk of pneumonia, and shorter sleep duration and fragmented sleep are associated with the common cold [28-31]. Found that insomnia before chemotherapy may increase the risk of immunity decline and infection due to chemotherapy during cancer treatment [32,33]. In this study, 68.12% of patients with non-operative

spinal infection had sleep disorders (insomnia), and statistical analysis showed no significant gender difference. This suggests that sleep disorders may be a potential cause of non-operative spinal infection.

In addition, Wang Q and his team found that there was a two-way relationship between sleep and intestinal flora [34,35]. They found that the three kinds of intestinal flora (class. Negativicutes, order. Selenomonadales, genus. Rikenellaceae RC9 gut group) was significantly positively related with insomnia, one type of gut microbiota (genus. Lactococcus) was significantly negatively associated with insomnia and belong to Rikenellaceae RC9 intestinal group and insomnia are mutually causal. It is speculated that the microbial-gut-brain axis also plays a role in the course of spinal infection.

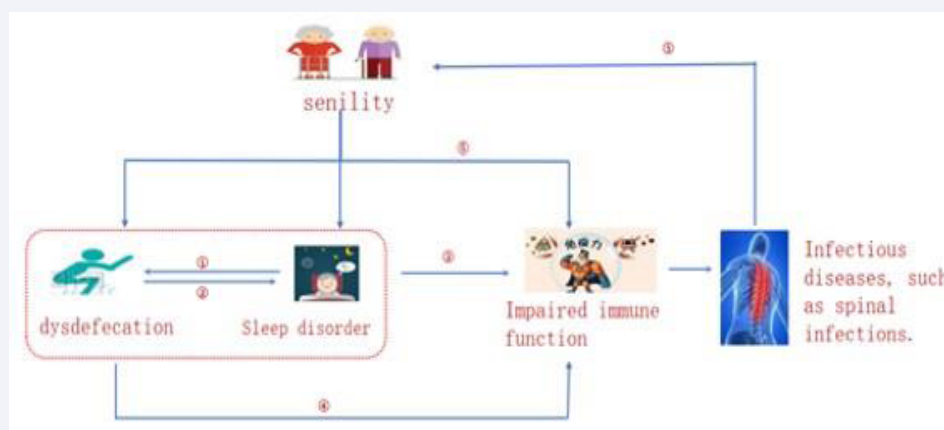
### Others and Infection

In this study, the place of residence of the patients was also counted, among which the rural patients were larger than the urban patients. However, no control study was conducted in this study, and it was not clear whether the place of residence was related to spinal infection. People living in rural areas are more likely to come into contact with animals such as cattle, sheep, pigs and chickens, as well as water, soil and crops contaminated with feces. Animals are a common source of zoonotic bacteria [36-39]. Contact with animals carrying zoonotic bacteria can increase the risk of human infection, which may lead to temporary residence of bacteria in the body, and gradually cause local or even systemic infection under the stimulation of certain causes in the body. Water, soil, and crops contaminated by feces contain many parasites or their oocysts [40,41] and viruses and bacteria [42,43], which are also easy to cause infection after contact.

In short, old age, sleep disorders, and defecation disorders are interrelated and interact with each other (Figure 1). They can all affect the innate and adaptive immunity of the body, resulting in reduced immunity, thereby leading to potential infection or inducing new infections. These three factors may be potential causes or risk factors for non-operative spinal infection.

### Suggest Measures

Traditional Chinese medicine believes that “there is healthy qi in the body, evil qi can not invade the body and cause disease; Where evil qi gathers, the healthy qi will be deficient.” Continuously improve the body’s healthy Qi, the evil qi can not invade the body. The Huang Di Nei Jing says, “Moderate diet, regular living and proper work can make both body and spirit healthy.....”. It can be seen that the degree of diet, regular life, moderate work and rest, and adequate sleep are important aspects of maintaining healthy qi. Studies suggest that diet may play a role in reducing immune aging through various inflammatory triggers [13]. For example, dietary vitamin supplements can reduce inflammation, and different food types and food intake can also regulate inflammation. Both aerobic exercise and anti-resistance exercise can delay the age-related decline of immune function in rapidly aging mice [44]. Long-term exercise can



**Figure 1** Diagram of potential causes of spinal infection.

Note: 1. Changes in sleep rhythm lead to changes in intestinal flora composition.

2. Defecation disorders affect sleep by regulating bacterial metabolites, endocrine signals, nerve signal immunity, etc.

3. Sleep disorders affect the immune function of the body by up-regulating adaptive immunity and down-regulating innate immunity.

4. Defecation disorder affects the immune function of the body by affecting the intestinal shielding barrier; increasing the permeability of the intestinal wall, causing inflammation and immunity.

5. Infectious diseases induce aging through a sustained inflammatory immune response. Aging affects the body's immune function through immune aging and inflammatory aging. Among them, sleep disorders and defecation disorders show a bidirectional relationship through the brain-gut-microbial axis.

improve the function of NK cells and neutrophils, reduce the level of monocyte subpopulation, increase the percentage of naive T cells and B cells, reduce Th17 cell polarization, and reduce markers of T cell aging [13]. These studies are consistent with our recommendations. Traditional Chinese medicine believes that it is not only necessary to cultivate healthy qi, but also to "avoid the evil and harmful wind." It can be seen that the change of evil qi in the four seasons, avoiding the invasion of the six evil Qi can also avoid the occurrence of diseases. Whether the rural living environment in this study is more susceptible to infection sources needs further research.

In conclusion, the elderly need to reduce the risk of non-surgical spinal infection from the following aspects:

- 1) Eat in moderation. Maintain a reasonable diet, maintain normal intestinal flora, and ensure normal bowel habits and frequency.
- 2) Living rules. Get enough sleep and maintain the normal circadian rhythm of sleep.
- 3) Moderate work and rest. Appropriate physical activity, increase the immunity of middle-aged and elderly people [45].
- 4) Avoid the evil wind. Appropriately avoid crowd gathering, avoid contact with sick people, and appropriately increase or decrease clothing according to seasonal and weather changes.

## Deficiencies and Prospects

- 1) This paper is a preliminary exploration study with a small sample size, and a correlation study with a large sample

size is needed in the future.

- 2) No controlled study was conducted in this paper, and relevant controlled studies are needed in the future.

3) Relevant laboratory indicators were also described and statistically analyzed in this paper, and it was preliminarily found that the increase of C-reactive protein, the increase of erythrocyte sedimentation rate, the decrease of prealbumin and the decrease of hemoglobin in women may be related to spinal infection, but further correlation exploration is needed. Moreover, this paper lacks the analysis of immune-related laboratory indicators, which is the direction of further exploration in the future.

4) In this paper, the incidence of combined diseases was analyzed, but no correlation analysis was made. It is mainly considered that these co-morbidities are closely related to aging, sleep disorders, and intestinal flora, so the correlation with spinal infection is not elaborated.

5) The number of affected vertebrae was much higher in the lumbar spine than in the thoracic spine, and the number of affected vertebrae in the cervical spine was the lowest. There was little variation in the prevalence of each lumbar segment. The affected vertebrae of the thoracic vertebrae were mainly concentrated in T8-T12. There are fewer affected vertebrae in the cervical spine, mainly concentrated in C4-C6. This may be related to the functional activity and stress of the lumbar spine. Studies have shown that sports-related activities have a high stress on the lumbar spine, much higher than the stress reported during daily activities and work tasks [46]. This is consistent with our results. The lumbar spine may be the most vulnerable site due to long-term accumulation of micro damage or acute

damage caused by a single maximum load compression force. In addition, the study found that activities initiated by the upper body produced lower compression values than those initiated by the lower body. The compression forces of the more experienced lifters in this experiment were lower than those predicted by a linear model based on less experienced lifters. Further research is also possible to reduce lumbar susceptibility by studying better posture to reduce compression in the lumbar spine. Studies have also suggested that, from a biomechanical perspective, flexible thoracic vertebrae can reduce lumbar disc stress and intervertebral stress, reduce lumbar load, and help prevent lumbar stress-related diseases [47]. It is also possible to study whether the stress load of the lumbar spine can be reduced by exercising the flexibility of the thoracic vertebrae. The thoracic vertebra, ribs and sternum constitute a relatively stable circular structure, so that the stability of the thoracic vertebra is much higher than that of the lumbar and cervical vertebra, which may be the reason why the prevalence of the thoracic vertebra is much smaller than that of the lumbar vertebra. In this study, the affected vertebrae of the thoracic vertebrae were mainly concentrated in the lower thoracic segment, and the correlation between the susceptibility of these parts and lung diseases needs further study.

6) This article briefly describes the relationship between aging (advanced age), sleep disorders (insomnia), defecation disorders (intestinal flora disorders) and non-operative spinal infection. It further emphasizes the advanced nature of the theory of "curing without disease", and puts forward the measures to reduce the risk of spinal infection after non-operation according to the theory of traditional Chinese medicine, hoping to attract people's attention to "preventing without disease first".

### Three Typical Cases of Spinal Infection in Elderly Patients with Sleep Disorders and Defecation Disorders Were Reported.

**Typical Case 1:** Patient Fan, male, 81 years old. Low back pain with limited movement for more than 10 days. After working more than 10 days ago, there was waist pain, accompanied by limited waist movement and weakness of both lower limbs. After bed rest, the pain was slightly relieved, but there was abdominal pain and abdominal distension, accompanied by difficulty in defecation and exhaust. Abdominal CT showed "low density focus of liver, cyst possible; Both kidneys slightly high density focus, high density cyst is possible; Calcification density in the left renal sinus area, calculus or vascular calcification may be possible; Prostatic hyperplasia; Local thickening of rectum wall", Thoraco lumbar MRI (May 8) indicated "thoraco lumbar degenerative diseases, abnormal signals at the relative edges of L3 and L4 vertebrae, possible endlaminitis, disc bulging at L4/5 and L5/S1, and spinal canal stenosis at the L4/5 level" (Figure 2a-c), diagnosis of "intestinal obstruction", after conservative treatment, abdominal pain and distension can be alleviated, the stool can be solved with the help of opening plug dew, but the low back pain still exists. After abdominal acupuncture and other treatments, the patient's stool could be resolved by itself, but the symptoms

of low back pain were not significantly relieved, and there was an unexplained fever with a maximum of 37.8°C. Re-examination of lumbar MRI (May 29) indicated that "abnormal signal of L3/4 disc and adjacent vertebral body with paravertebral soft tissue swelling, infectious lesions were considered" (Figure 2d-f). Blood culture results indicated enterococcus faecalis, and anti-infective treatment was given according to drug sensitivity results.

**Discussion:** The patient had a history of lumbar sprain, advanced age, lack of sleep, and weakness of healthy qi. Patients due to bed defecation disorders, resulting in intestinal flora disorders, endogenous evil (intestinal bacteria - Enterococcus faecalis) in the body of weak healthy qi into the body's blood circulation, resulting in bloodstream infection, and then with the bloodstream infection invasion of the lumbar spine, resulting in lumbar spine infection.

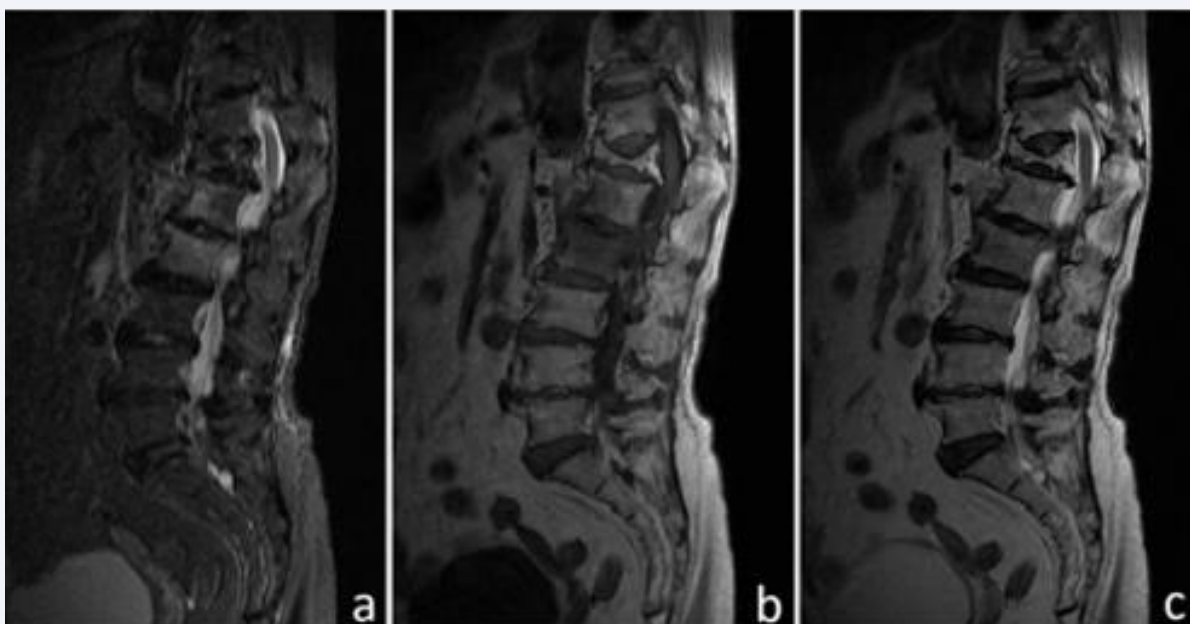
**Typical Case 2:** The patient was Wei, female, 84 years old. Recurrent fever with lumbago and abdominal pain for 5 days. 5 days ago, there was no obvious cause of fever, the highest body temperature was 39.5°C, accompanied by chills, chills, abdominal pain, the lower abdomen, the self-complaint was knife cutting pain, accompanied by constipation, normal constipation, stool once every 6-7 days, exhaust gas, accompanied by pain in the waist and right hip, limited movement, accompanied by frequent urination, accompanied by dry mouth, no fatigue, night sweats, dizziness, headache, and muscle aches. No nausea, vomiting, abdominal distension, diarrhea, cough, cough grade, chest tightness, wheezing, urgent urination, pain in urine, dry throat, mouth ulcer, rash and other discomfort, fever still repeated after taking medication. Lumbar MRI indicated that "abnormal signals of L1 and 2 vertebra and mixed signals of surrounding soft tissues, considering the high possibility of infectious lesions combined with medical history" (Figure 3). Blood culture indicated "Streptococcus agalactiae", and the symptoms improved after anti-infective treatment according to drug sensitivity.

**Discussion:** The patient was normally constipated, once every 6-7 days, and had bowel dysfunction, which led to intestinal flora imbalance. In addition, due to her advanced age, lack of sleep, and weakness of healthy qi, the internal evil gas (Streptococcus agalactiae - which can be normally colonized in the human reproductive tract, digestive tract and nasal cavity) invaded the body's blood circulation, resulting in bloodstream infection, and then invaded the lumbar spine with the bloodstream infection, resulting in lumbar spine infection.

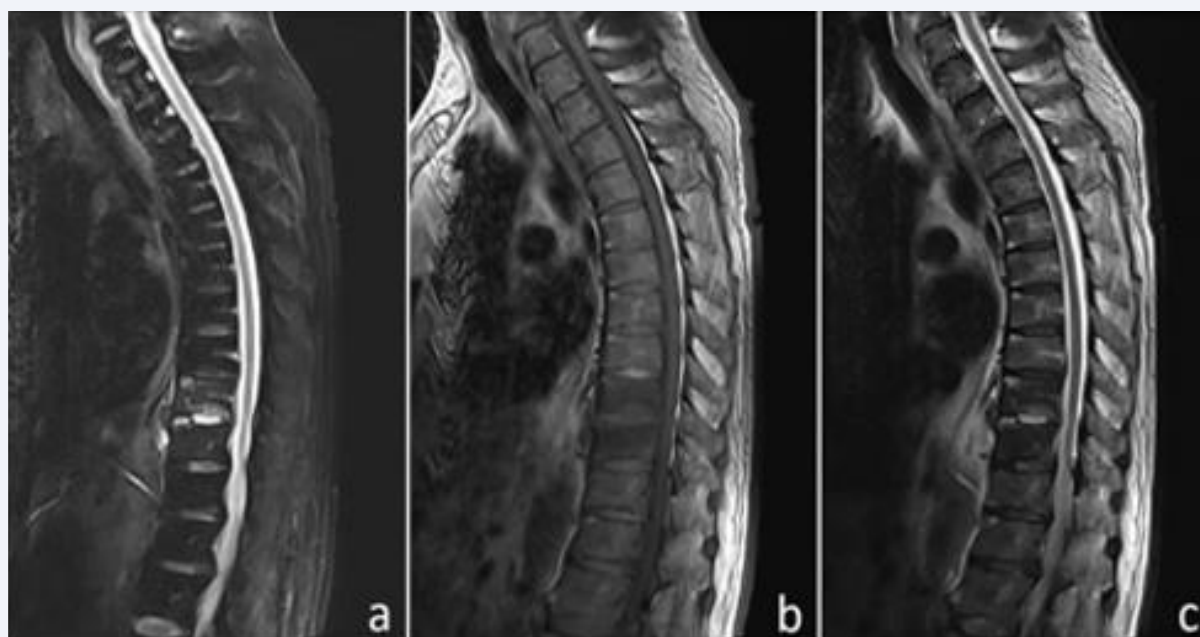
**Typical Case 3:** Patient Wang, male, 76 years old. Low back pain with recurrent fever for 20 days. The patient usually has abdominal distension and constipation (once every 3-4 days). Low back pain and recurrent high fever, up to 38.5°C, with chills, no obvious chills. MRI of the thoracic vertebra reveals "abnormal signals in the T9, T10 vertebrae, intervertebral space and surrounding soft tissues, not excluding infection" (Figure 4). Blood culture indicated "Escherichia coli", and symptoms improved after anti-infective treatment according to drug sensitivity.



**Figure 2** a-c and d-f were magnetic resonance images of May 8 and May 29, 2024, respectively. Magnetic resonance imaging of the lumbar vertebra showed signs of bone abnormalities in L3-4.



**Figure 3** Magnetic resonance imaging of the lumbar vertebra showed signs of bone abnormalities in L1-2.



**Figure 4** Magnetic resonance imaging of the thoracic vertebra showed signs of bone abnormalities in 19-10.

**Discussion:** The patient had a history of bladder tumor and rheumatoid arthritis, advanced age, lack of sleep, and weak healthy qi. Normal constipation, defecation disorders, resulting in intestinal flora disorders, endogenous evil (*Escherichia coli*) in the body of healthy qi weak into the body's blood circulation, resulting in bloodstream infection, and then with the bloodstream infection invasion of the thoracic vertebra, resulting in thoracic vertebra infection.

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