

Primary spontaneous pneumothorax presenting to a chiropractic clinic as undifferentiated thoracic spine pain: a case report

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Objective: *To present a case of primary spontaneous pneumothorax presenting to a chiropractic clinic as undifferentiated thoracic spine pain.*

Clinical Features: *A tall thin 25-year-old male anxiously presented to a chiropractic clinic with six days of sudden unexplained left thorax pain. His breathing was laboured and his dry cough aggravating. After assessment a high clinical suspicion of primary spontaneous pneumothorax prevailed.*

Intervention and Outcome: *The patient was referred to hospital for further investigation and primary spontaneous pneumothorax was confirmed on chest radiograph. He underwent immediate tube thoracostomy to drain the air from his pleural space and to re-inflate his lung. After three days the tube was removed. By two weeks the lung had returned to full size. No recurrences have occurred to date.*

Conclusions: *Primary spontaneous pneumothorax is a medical emergency in the presence of shortness of breath. The focus of treatment is to drain air from the pleural linings and to prevent recurrences. In less severe cases, patients may believe they have thoracic spine pain and seek manual therapy care. This case highlights the*

Objectif : *Présenter un cas de pneumothorax spontané primaire présenté à une clinique chiropratique comme douleur de la colonne thoracique indifférenciée.*

Caractéristiques cliniques : *Un homme grand et mince de 25 ans s'est présenté anxieusement à une clinique de chiropratique en se plaignant d'une douleur soudaine inexplicée dans le thorax gauche pendant six jours. Sa respiration était laborieuse et sa toux sèche s'aggravait. Après l'examen, une forte suspicion clinique de pneumothorax spontané primaire s'est imposée.*

Intervention et résultats : *Le patient a été orienté à l'hôpital pour des examens supplémentaires, et le pneumothorax spontané primaire a été confirmé à la suite de la radiographie thoracique. Il a immédiatement subi une insertion du drain thoracique afin de drainer l'air à partir de sa cavité pleurale et de regonfler son poumon. Au bout de trois jours, le drain a été retiré. En deux semaines, le poumon a retrouvé sa taille normale. Pas de récurrence à ce jour.*

Conclusions : *Le pneumothorax spontané primaire est une urgence médicale en cas d'essoufflement. L'objectif du traitement est de vider l'air des doublures pleurales et de prévenir les récurrences. Dans les cas moins graves,*

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important role chiropractors have as primary contact health care providers.

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KEY WORDS: chiropractic, pneumothorax, chest

Introduction

Primary spontaneous pneumothorax remains a significant health problem.^{1,2} It ranks high on the list of common medical conditions, especially in the emergency department. A pneumothorax is defined as the presence of air in the pleural cavity which leads to a collapsed lung.

There are several types of pneumothoraces. Over half pneumothoraces are traumatic, either accidental or iatrogenic; the remaining occur without any preceding trauma and are labelled spontaneous pneumothorax (SP). SP can be divided into two types – primary and secondary. Primary Spontaneous Pneumothorax (PSP) is the idiopathic variety which occurs in the otherwise healthy person. In Secondary Spontaneous Pneumothorax (SSP) an underlying disease state responsible for the pneumothorax can be identified. SSP is associated with underlying lung diseases such as cystic fibrosis, Chronic Obstructive Pulmonary Disease, Acquired Immune Deficiency Syndrome and tuberculosis, with peak incidence with those aged >55 yrs.¹ The consequences of pneumothorax in patients with pre-existing lung disease are significantly greater and management is potentially more difficult. The development of a one-way air valve leads to tension pneumothorax and can occur in either traumatic or spontaneous cases. Unless reversed by effective treatment, this situation can progress and cause death.³

The most likely pneumothorax presenting to chiropractic clinic is SP. SP remains a significant health problem, with an annual incidence of 18-28 per 100,000 population in males and 1.2-6.0 per 100,000 population in females.² Mortality rates of 1.26/million for men and 0.62/million for women per annum have been reported.¹ The mortality of SP can be high, especially in older subjects and those

les patients peuvent croire qu'ils ont une douleur à la colonne thoracique et chercher des soins de thérapie manuelle. Ce cas met en évidence le rôle important des chiropraticiens en tant que fournisseurs de soins de santé primaires.

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MOTS CLÉS : chiropratique, pneumothorax, poitrine

with SSP.⁴ The course of SP remains unpredictable, with a recurrence rate ranging from 25-54%.⁵ Smoking is an important risk factor for PSP. The lifetime risk of developing pneumothorax in smoking males is 12%, compared with 0.1% in non-smoking males.^{6,7} Patients with PSP tend to be taller than control patients.^{5,8} The gradient of negative pleural pressure increases from the lung base to the apex, so that alveoli at the lung apex in tall individuals are subject to significantly greater distending pressure than those at the base of the lung, and the vectors in theory, predispose to the development of apical subpleural blebs.⁹ Although it is to some extent counterintuitive, there is no evidence that a relationship exists between the onset of pneumothorax and physical activity, the onset being as likely to occur during sedentary activity.¹⁰ Clinical signs and symptoms of SP include sudden sharp chest pain worse with breathing and coughing, chest tightness, dyspnea, easily fatigued, nasal flaring, anxiety, reduced lung expansion, hyper-resonance and diminished breath sounds on the side of the pneumothorax, cyanosis, sweating, severe tachypnea and hypotension.^{3,11}

Non-specific mechanical Thoracic Spine Spain (TSP) is a common presentation in both clinical practice and in the general population with a high prevalence among healthy individuals, thus contributing to a significant personal and community burden.¹²⁻¹⁴ Thoracic facet¹⁵ and costotransverse joint pain patterns are well demonstrated as contributing to TSP¹⁶. Thoracic spinal manipulative therapy in the care of TSP is often utilized by many professional health disciplines and is demonstrated to have a reasonable degree of efficacy versus placebo in preliminary studies.¹⁷ Although patients may present clinically with what they believe is TSP the following case dem-

onstrates the importance of thorough history taking and assessment.

Case Presentation

Believing that he had spine pain and that chiropractic manipulation would be helpful, a 25-year-old active male cabinetmaker, presented with sudden sharp progressing chest and rib pain of 6 days duration. This gentleman was very tall and thin (6'9"/205.7 cm and 180lbs/81.6 kg). Onset was insidious and his symptoms were localized to the left chest, rib cage, thoracolumbar spine and posterior shoulder. His breathing was laboured, painful and short. A dry cough was present and aggravated his symptoms. Over-the-counter ibuprofen was not helping. He reported smoking one pack per week. Due to his symptoms, he was unusually anxious. His sleep was significantly disturbed and limited. Auscultation did not reveal obvious abnormality; the clinician admits to limited experience with lung auscultation and therefore considered this as

a possible false negative. Global chest compression and thoracic joint palpation were aggravating. Global active/passive/resisted thoracic ranges of motion were severely limited and painful. Based on the history and physical findings a high clinical suspicion of primary spontaneous pneumothorax prevailed and the patient was referred to hospital for chest radiography and further investigation.

At the hospital, chest radiographs were performed and a 40% spontaneous pneumothorax was confirmed in the left lung (Figure 1A). Immediate tube thoracostomy was performed to drain the trapped air in the pleural linings and to allow for the lung to re-inflate. Shortly after tube insertion, additional radiographs were taken demonstrating an immediate decrease in the size of the pneumothorax to 15% (Figure 1B). The patient remained in hospital one day under supervision and then was released with chest tube still inserted. The tube was removed on the third day and follow up radiographs were taken, which still demonstrated the presence of a small pneumothorax.

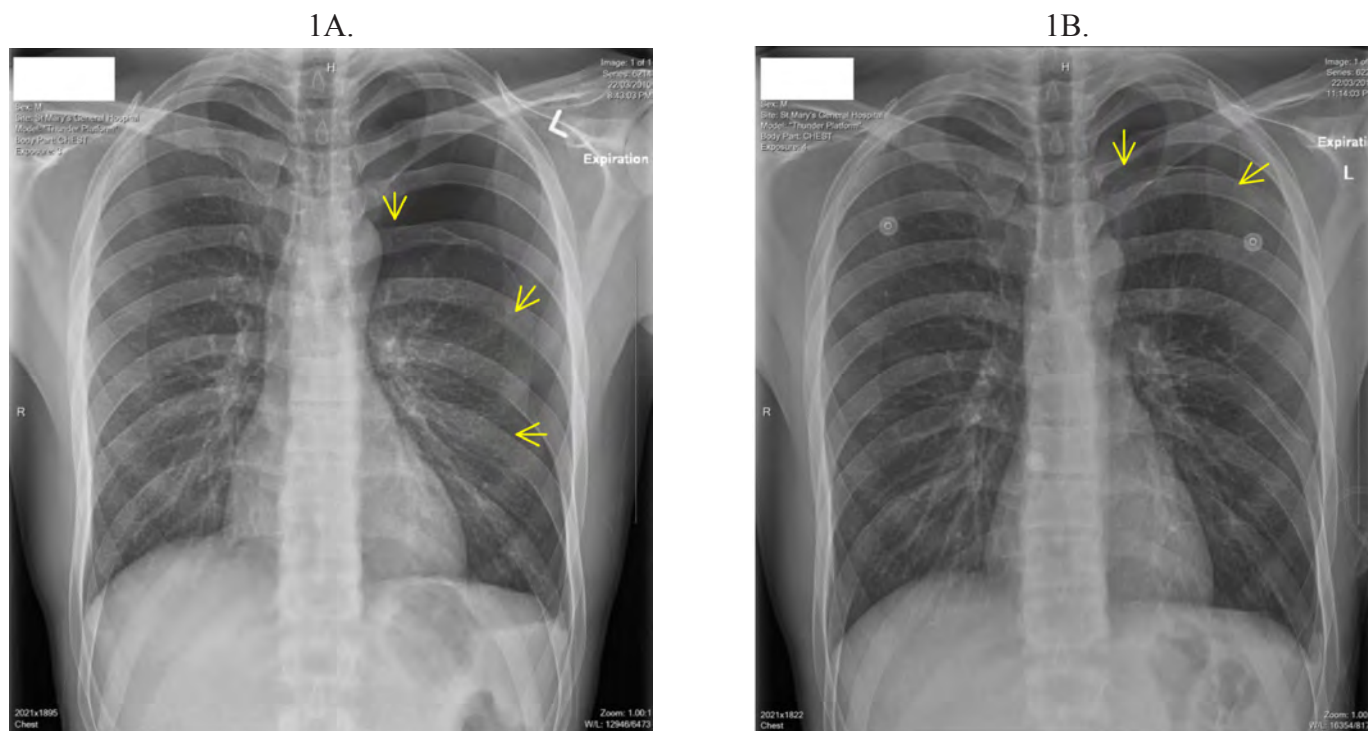


Figure 1.

Expiration chest radiographs taken at hospital day of presentation. 1A. Demonstrating 40% left lung pneumothorax (arrows). 1B. Same day, chest tube inserted and pneumothorax decreased to 15% (arrows).

At two weeks follow up radiographs revealed complete resolution of the pneumothorax (Figure 2). The patient has had no recurrences.

Discussion

The pathophysiology of pneumothorax remains unknown. Subpleural blebs and bullae are found at the lung apices at thoracoscopy and on CT scan in up to 90% of cases of PSP, and are thought to play a role.^{18,19} Pulmonary blebs are small subpleural thin walled air containing spaces, not larger than 1-2cm in diameter; their walls being less than 1 mm thick. It's thought if a bleb ruptures it can allow air to escape into the pleural space. Blebs are also observed in cell apoptosis²⁰ which is a cells self-execution plan to guided rupture. It is theorized that the pleural lining cells are committing apoptosis leading to the creation of spontaneous pneumothorax. Pulmonary bullae are focal regions of emphysema measuring more than 1cm in diameter with very thin cell walls.²¹ The location of the unique

or diffuse sites of air leakage leading to PSP is usually unknown. Distal airway inflammation due to cigarette smoking seems to play a key role. No clinician should miss the opportunity, especially in young people, to encourage smoking cessation. Most young patients continue to smoke after their first episode of PSP, showing that clinical strategies need to be improved in order to better address the needs of this particular age group.²²

Tension pneumothorax can develop in any type of pneumothorax, traumatic, PSP, or SSP. The development of a tension pneumothorax is a medical emergency requiring heightened awareness in a specific range of clinical situations. Patients are to be referred immediately for emergency care. Treatment is with oxygen and emergency decompression. A tension pneumothorax arises as a result of the development of a one-way valve system at the site of the breach in the pleural membrane, permitting air to enter the pleural cavity during inspiration but preventing egress of air during expiration, with consequent

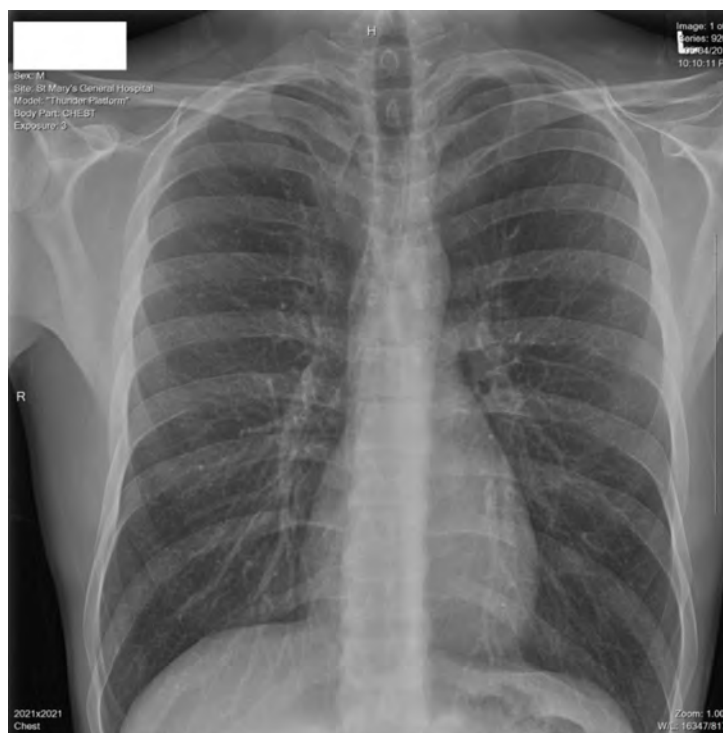


Figure 2.

Two weeks after tube inserted there is a complete resolution of pneumothorax.

increase in the intrapleural pressure such that it exceeds atmospheric pressure for much of the respiratory cycle. As a result, impaired venous return and reduced cardiac output results in the typical features of hypoxaemia and haemodynamic compromise.^{23,24}

Any clinical suspicion of pneumothorax must be assessed with a stethoscope specifically listening for decreased or absent breathing sounds on the affected side. A diagnosis of PSP is usually made by expiration chest radiography. Standing erect PA and lateral chest radiographs are the mainstay. CT scan is the gold standard in the detection of small pneumothoraces and in size estimation.²⁵ It is important to always check for associated rib fracture in all cases of pneumothorax. It is not unusual for patients with PSP to present several days after onset of symptoms because of the relatively minor severity.²⁶

There are two main aims when treating pneumothorax; first, insure the trapped air is evacuated and that the lung is re-expanded; secondly, prevent recurrence. In first episodes of PSP observation and simple needle aspiration are established first-line therapies.²⁷ If the PSP is small without significant breathlessness, observation is the treatment of choice. Adequate analgesia and high concentration oxygen therapy without any interventional therapy are usually enough to relieve the patients' symptoms.¹¹ Observation is the guideline recommendation from the British Thoracic Society for first line treatment of patients with small closed PSP (<15% of lung size) with minimal symptoms. A 70-80% resolution rate can be achieved in these patients in about 7 weeks.²⁹ Observation alone is inappropriate for breathless patients who require active intervention, needle aspiration or chest tube drainage. If observation is unwarranted, needle aspiration is a more conservative second choice. However, in the case of failed aspiration, a chest tube should be inserted. Within 24hrs of admission patients should be referred to a respiratory specialist since intercostal tube placement can lead to serious complications, even death.³⁰ Patients should be hospitalized while a tube is in chest, at least until stable. Video-assisted Thoracoscopic Surgery (VATS) is a newer alternative to chest tube drainage and has been shown to be more cost-effective³¹ with similar result.

Recurrences are common and prevention is therapeutically challenging.³² The risk of recurrence of PSP is as high as 54% within the first four years, with iso-

lated risk factors including smoking, height and age >60 years.^{5,9,33} After a first recurrence, the likelihood of subsequent recurrences increases progressively, up to 62% for a second recurrence and 83% for a third.³⁴ Patients should avoid air travel until full resolution of pneumothorax has been confirmed by chest radiograph. The consequence of a recurrence during air travel may be serious.³⁵ After a pneumothorax scuba diving should be permanently avoided.³⁶ There is no evidence to link recurrence with physical exertion.¹⁰ The patient can be advised to return to work and resume normal physical activities once all symptoms have resolved, although it is reasonable to advise that sports that involve extreme exertion and physical contact should be avoided until full resolution.¹¹

To prevent recurrences of SP pleurodesis should be considered.¹⁸ Pleurodesis is a medical procedure performed surgically or chemically in which the space between the parietal and visceral pleural is artificially obliterated. It involves the adhesion of the two pleurae producing a diffuse pleural symphysis.

If the PSP is small without significant breathlessness, the patients' chief complaint can be misrepresented as unspecific Thoracic Spine Pain (TSP). This presentation can lead patients to seek chiropractic care for non-specific mechanical TSP as this is a common presentation in clinical chiropractic practice. It is necessary to be clinically aware of differentials when an undifferentiated thoracic spine condition is present, as serious cases, such as pneumothorax, cancer and heart and lung disease may require emergency medical care.

In summary, a young tall and thin male who was a smoker, presented to a chiropractor with insidious left sided thorax pain thinking he required manual therapy for a thoracic spine complaint. He was experiencing Primary Spontaneous Pneumothorax. It is imperative that when pneumothorax is suspected that immediate referral be made to the hospital for further investigation and possibly acute emergency management.

This case highlights an example of an emergency care situation of thoracic pain presenting to a chiropractic clinician. Chiropractors are primary contact health care providers, and future research on the their role and involvement in emergency care encounters is warranted in order to demonstrate the value of integrating chiropractors into interdisciplinary collaborative models such as hospital or multidisciplinary health teams. There is a growth in chiro-

practic researchers focusing on less traditional chiropractic research pursuits, including innovative collaborative research efforts in undifferentiated chest pain.³⁷ Therefore, it appears that an initiative of this nature would be in align with the efforts to move beyond simply the spine and into other primary contact musculoskeletal areas that benefit both the patient and the profession. Successful management of emergency care cases can only emphasize the role the chiropractic profession has in the health care system.

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