

World Journal of *Clinical Cases*

World J Clin Cases 2023 June 16; 11(17): 3932-4209



REVIEW

- 3932 Liver replacement therapy with extracorporeal blood purification techniques current knowledge and future directions

Papamichalis P, Oikonomou KG, Valsamaki A, Xanthoudaki M, Katsiafylloudis P, Papapostolou E, Skoura AL, Papamichalis M, Karvouniaris M, Koutras A, Vaitis E, Sarchosi S, Papadogoulas A, Papadopoulos D

MINIREVIEWS

- 3949 Prediction models for recurrence in patients with small bowel bleeding
Kim JH, Nam SJ
- 3958 Investigation of possible relationship between atopic dermatitis and salivary biomarkers, stress, and sleep disorders
Estefan J, Ferreira DC, Cavalcante FS, dos Santos KRN, Ribeiro M
- 3967 Value of clinical applications of differential pressure and relative pressure imaging in the left ventricle
Zheng AS, Yu HX
- 3976 Low-dose immunotherapy as a potentiator to increase the response with neo-adjuvant chemotherapy in oral cancers
Rathinasamy N, Muthu S, Krishnan A
- 3980 Kidney disease in patients with chronic liver disease: Does sex matter?
Cooper KM, Colletta A, Moulton K, Ralto KM, Devuni D

ORIGINAL ARTICLE

Case Control Study

- 3993 Elabela is a reliable biomarker for predicting early onset preeclampsia: A comparative study
Amer Ali E, Nori W, Salman AF, Al-Rawi TSS, Hameed BH, Al-Ani RM

Retrospective Cohort Study

- 4003 Acute-on-chronic liver failure is independently associated with higher mortality for cirrhotic patients with acute esophageal variceal hemorrhage: Retrospective cohort study
Terres AZ, Balbinot RS, Muscope ALF, Longen ML, Schena B, Cini BT, Rost Jr GL, Balensiefer JIL, Eberhardt LZ, Balbinot RA, Balbinot SS, Soldara J

Retrospective Study

- 4019 Elastic fiber degradation in the development of pediatric granuloma annulare: Report of 39 cases
Zhang DY, Zhang L, Yang QY, Xie YC, Jiang HC, Li JZ, Shu H

- 4026** Anti-bacterial mechanism of baicalin-tobramycin combination on carbapenem-resistant *Pseudomonas aeruginosa*

Jin LM, Shen H, Che XY, Jin Y, Yuan CM, Zhang NH

SYSTEMATIC REVIEWS

- 4035** Acknowledging the use of botanicals to treat diabetic foot ulcer during the 21st century: A systematic review

Narzary I, Swarnakar A, Kalita M, Middha SK, Usha T, Babu D, Mochahary B, Brahma S, Basumatary J, Goyal AK

CASE REPORT

- 4060** Pregabalin induced balance disorder, asthenia, edema, and constipation in an elderly adult: A case report

Ma LP, Wen C, Zhao TX, Jiang XM, Gu J

- 4065** Emergency internal iliac artery temporary occlusion after massive hemorrhage during surgery of cesarean scar pregnancy: A case report

Xie JP, Chen LL, Lv W, Li W, Fang H, Zhu G

- 4072** Hemophagocytic lymphohistiocytosis after autologous stem cell transplantation in angioimmunoblastic T-cell lymphoma: A case report

Zhang ZR, Dou AX, Liu Y, Zhu HB, Jia HP, Kong QH, Sun LK, Qin AQ

- 4079** Successful reconstruction of an ankle defect with free tissue transfer in a hemophilia A patient with repetitive hemoarthrosis: A case report

Lee DY, Lim S, Eo S, Yoon JS

- 4084** Primary pelvic *Echinococcus granulosus* infection: A case report

Abulaiti Y, Kadi A, Tayier B, Tuerkan T, Shalayiadang P, Abulizi A, Ahan A

- 4090** Epstein-Barr virus-induced infection-associated hemophagocytic lymphohistiocytosis with acute liver injury: A case report

Sun FY, Ouyang BQ, Li XX, Zhang T, Feng WT, Han YG

- 4098** Cardiac arrest secondary to pulmonary embolism treated with extracorporeal cardiopulmonary resuscitation: Six case reports

Qiu MS, Deng YJ, Yang X, Shao HQ

- 4105** Flared inflammatory episode transforms advanced myelodysplastic syndrome into aplastic pancytopenia: A case report and literature review

Ju B, Xiu NN, Xu J, Yang XD, Sun XY, Zhao XC

- 4117** Frontal penetrating arrow injury: A case report

Rodríguez-Ramos A, Zapata-Castilleja CA, Treviño-González JL, Palacios-Saucedo GC, Sánchez-Cortés RG, Hinojosa-Amaya LG, Nieto-Sanjuanero A, de la O-Cavazos M

- 4123** Chest wall osteochondroma resection with biologic acellular bovine dermal mesh reconstruction in pediatric hereditary multiple exostoses: A case report and review of literature

Alshehri A

- 4133** Massive pulmonary embolism in Klippel-Trenaunay syndrome after leg raising: A case report
Lo CY, Chen KB, Chen LK, Chiou CS
- 4142** Improved super-elastic Ti-Ni alloy wire intrusion arch for skeletal class II malocclusion combined with deep overbite: A case report
Yang CY, Lin CC, Wang LJ, Chen YH, Yu JH
- 4152** Glucocorticoid pulse therapy in an elderly patient with post-COVID-19 organizing pneumonia: A case report
Park S, Jang Y, Koo SM, Nam BD, Yoon HY
- 4159** Endoscopic and surgical treatment of jejunal gallstone ileus caused by cholecystoduodenal fistula: A case report
Fan WJ, Liu M, Feng XX
- 4168** Application of advanced platelet-rich fibrin for through-and-through bony defect during endodontic surgery: Three case reports and review of the literature
Algahtani FN, Almohareb R, Aljamie M, Alkhunaini N, ALHarthi SS, Barakat R
- 4179** Facial Merkel cell carcinoma in a patient with diabetes and hepatitis B: A case report
Ren MY, Shi YJ, Lu W, Fan SS, Tao XH, Ding Y
- 4187** Pregnancy and lactation-associated osteoporosis with pyogenic spondylitis: A case report
Zhai K, Wang L, Wu AF, Qian Y, Huang WM
- 4194** Hourglass-like constriction of the anterior interosseous nerve in the left forearm: A case report
He R, Yu JL, Jin HL, Ng L, Wang JC, Li X, Gai TT, Zhou Y, Li DP
- 4202** Crohn's disease in human immunodeficiency virus-infected patient: A case report
Vinikaite A, Kurlinkus B, Jasinskaite D, Strainiene S, Buineviciute A, Sadauskaite G, Kiudelis V, Kazenaite E

ABOUT COVER

Editorial Board Member of *World Journal of Clinical Cases*, Chun-Lin Ou, Doctor, PhD, Associate Professor, Associate Research Scientist, Department of Pathology, Xiangya Hospital, Central South University, Xiangya Hospital, Central South University, Changsha 410008, Hunan Province, China. ouchunlin@csu.edu.cn

AIMS AND SCOPE

The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

INDEXING/ABSTRACTING

The WJCC is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2022 Edition of Journal Citation Reports® cites the 2021 impact factor (IF) for WJCC as 1.534; IF without journal self cites: 1.491; 5-year IF: 1.599; Journal Citation Indicator: 0.28; Ranking: 135 among 172 journals in medicine, general and internal; and Quartile category: Q4. The WJCC's CiteScore for 2021 is 1.2 and Scopus CiteScore rank 2021: General Medicine is 443/826.

RESPONSIBLE EDITORS FOR THIS ISSUE

Production Editor: Hua-Ge Yin; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.

NAME OF JOURNAL

World Journal of Clinical Cases

ISSN

ISSN 2307-8960 (online)

LAUNCH DATE

April 16, 2013

FREQUENCY

Thrice Monthly

EDITORS-IN-CHIEF

Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

EDITORIAL BOARD MEMBERS

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

June 16, 2023

COPYRIGHT

© 2023 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

<https://www.wjgnet.com/bpg/gerinfo/204>

GUIDELINES FOR ETHICS DOCUMENTS

<https://www.wjgnet.com/bpg/GerInfo/287>

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

<https://www.wjgnet.com/bpg/gerinfo/240>

PUBLICATION ETHICS

<https://www.wjgnet.com/bpg/GerInfo/288>

PUBLICATION MISCONDUCT

<https://www.wjgnet.com/bpg/gerinfo/208>

ARTICLE PROCESSING CHARGE

<https://www.wjgnet.com/bpg/gerinfo/242>

STEPS FOR SUBMITTING MANUSCRIPTS

<https://www.wjgnet.com/bpg/GerInfo/239>

ONLINE SUBMISSION

<https://www.f6publishing.com>



Pregnancy and lactation-associated osteoporosis with pyogenic spondylitis: A case report

Kai Zhai, Lei Wang, Ai-Fang Wu, Ying Qian, Wei-Min Huang

Specialty type: Medicine, research and experimental

Provenance and peer review: Unsolicited article; Externally peer reviewed.

Peer-review model: Single blind

Peer-review report's scientific quality classification

Grade A (Excellent): 0
Grade B (Very good): B, B
Grade C (Good): 0
Grade D (Fair): 0
Grade E (Poor): 0

P-Reviewer: Barbosa OA, Brazil; Liu M, China

Received: April 12, 2023

Peer-review started: April 12, 2023

First decision: April 26, 2023

Revised: May 4, 2023

Accepted: May 22, 2023

Article in press: May 22, 2023

Published online: June 16, 2023



Kai Zhai, Lei Wang, Wei-Min Huang, Department of Orthopedics, 960 Hospital of PLA, Jinan 250031, Shandong Province, China

Ai-Fang Wu, Department of Obstetrics, 960 Hospital of PLA, Jinan 250031, Shandong Province, China

Ying Qian, Department of Endocrinology, 960 Hospital of PLA, Jinan 250031, Shandong Province, China

Corresponding author: Wei-Min Huang, MD, Associate Professor, Neurosurgeon, Department of Orthopedics, 960 Hospital of PLA, No. 25 Shifan Road, Jinan 250031, Shandong Province, China. ever_23@163.com

Abstract

BACKGROUND

This case report presents a patient with pyogenic spondylitis (PS) associated with lactation-related osteoporosis during pregnancy. The 34-year-old female patient experienced low back pain for one month, beginning one month postpartum, with no history of trauma or fever. Dual-energy X-ray absorptiometry of the lumbar spine revealed a Z-score of -2.45, leading to a diagnosis of pregnancy and lactation-associated osteoporosis (PLO). The patient was advised to cease breastfeeding and take oral calcium and active vitamin D. Despite these interventions, her symptoms worsened, and she had difficulty walking one week later, prompting her to revisit our hospital.

CASE SUMMARY

Lumbar magnetic resonance imaging (MRI) scans showed abnormal signals in the L4 and L5 vertebral bodies and intervertebral space, while an enhancement scan displayed abnormal enhanced high signals around the L4/5 intervertebral disc, suggesting a lumbar infection. A needle biopsy was performed for bacterial culture and pathological examination, culminating in a final diagnosis of pregnancy and lactation-related osteoporosis with PS. Following treatment with anti-osteoporotic medications and antibiotics, the patient's pain gradually subsided, and she returned to normal life within five months. PLO is a rare condition that has garnered increasing attention in recent years. Spinal infections during lactation in pregnancy are also relatively uncommon.

CONCLUSION

Both conditions primarily manifest as low back pain but require distinct

treatments. In clinical practice, when diagnosing patients with pregnancy and lactation-associated osteoporosis, the possibility of spinal infection should be considered. A lumbar MRI should be conducted as needed to prevent delays in diagnosis and treatment.

Key Words: Pregnancy; Lactation; Osteoporosis; Pyogenic spondylitis; Case report

©The Author(s) 2023. Published by Baishideng Publishing Group Inc. All rights reserved.

Core Tip: This study described a special clinical condition of pregnancy and lactation-associated osteoporosis with pyogenic spondylitis. Both diseases present mainly as low back pain but are treated differently. The current study helps increase the awareness of this particular disease and reduce the clinical underdiagnosis rate.

Citation: Zhai K, Wang L, Wu AF, Qian Y, Huang WM. Pregnancy and lactation-associated osteoporosis with pyogenic spondylitis: A case report. *World J Clin Cases* 2023; 11(17): 4187-4193

URL: <https://www.wjgnet.com/2307-8960/full/v11/i17/4187.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v11.i17.4187>

INTRODUCTION

Pregnancy and lactation-associated osteoporosis (PLO) is a relatively rare clinical condition characterized by osteoporosis diagnosed during the third trimester of pregnancy up to 18 mo postpartum[1,2]. Its etiology remains unclear, but previous studies suggest that factors such as fetal osteogenesis during pregnancy, hormonal changes, genetic predisposition, and calcium loss after lactation may contribute to its development[3-5]. Common clinical manifestations include back or hip pain, and in severe cases, compressive vertebral fractures or hip fractures may occur[6,7].

Pyogenic spondylitis (PS) is a nonspecific bacterial infection affecting the vertebral body, intervertebral disc, or surrounding soft tissues. It predominantly occurs in the lumbar spine, involving both the intervertebral disc and adjacent vertebral bodies. In some instances, it can present as psoas abscess or spinal epidural abscess[8,9]. Although previous studies have documented cases of PS during pregnancy and breastfeeding[10,11], no reports have been found describing the co-occurrence of PLO and PS. When these conditions coexist, patients may initially experience only low back pain, which is easily overlooked, leading to delayed diagnosis and treatment and potentially irreversible consequences. This review presents a case of PLO with PS, which improved clinically after conservative treatment, in order to raise awareness of this particular disease and reduce the rate of clinical underdiagnosis.

CASE PRESENTATION

Chief complaints

A 34-year-old woman presented at our hospital with a one-month history of low back pain. She had undergone spontaneous delivery of a baby girl at a local hospital two months prior to this visit and had been breastfeeding the infant. The onset of her low back pain began one month after delivery and gradually worsened.

History of present illness

Upon her initial visit to our clinic, a dual-energy X-ray absorptiometry (DXA) was performed to assess her lumbar spine bone mineral density (BMD), revealing a Z-score of -2.45. Consequently, she was diagnosed with PLO and was advised to discontinue breastfeeding and to initiate oral calcium and vitamin D supplementation. However, her symptoms continued to worsen, leading to difficulty walking, and she was readmitted to the hospital one week later.

History of past illness

No trauma or fever was identified as a cause during the course of the disease. The patient had no history of chronic conditions, no exposure to cattle or sheep, no use of special drugs such as glucocorticoid.

Personal and family history

The patient denied a family history of osteoporosis.

Physical examination

Upon readmission, the patient had a body temperature of 36.7 °C, height of 1.61 m, weight of 55 kg, and a body mass index (BMI) of 21.2 kg/m². Physical examination revealed significantly limited range of lumbar motion and mild non-radiating pain upon percussion at the lumbar region. Muscle strength, sensation, and muscle tone in both lower limbs were found to be normal.

Laboratory examinations

Laboratory tests were performed upon admission and the results are shown in Table 1. These tests included a complete blood count, sedimentation rate, C-reactive protein (CRP), calcitoninogen, and bone metabolism markers. Additionally, Brucella serum agglutination and tuberculosis antinuclear antibody tests were performed, with both yielding negative results. Serum calcium, phosphorus, and sex hormone levels are shown in Table 2.

Imaging examinations

Magnetic resonance imaging (MRI) of the lumbar spine was performed upon admission, revealing abnormal signals in the L4 and L5 vertebral bodies and the intervertebral space. The contrast-enhanced scan demonstrated abnormally high signals surrounding the intervertebral space (Figure 1).

Literature review

A comprehensive literature search was conducted using PubMed, Embase, and Web of Science as electronic databases. Citations were identified by employing a combination of the following keywords: “pregnancy and lactation-associated osteoporosis”, “spondylodiscitis”, “spinal infection”, “pyogenic spondylitis”, and “intervertebral space infection”, from the inception of each database through December 2022. The search terms encompassed the title, abstract, and topic terms. To date, no reports of concomitant PLO with PS have been identified.

FINAL DIAGNOSIS

The patient was diagnosed with PLO and PS based on clinical assessment. To identify the causative bacteria, an X-ray-guided biopsy of the L5 vertebral body was performed. A cancellous bone strip was extracted from the L5 lesion using a puncture needle, with a portion sent for bacterial culture and drug sensitivity testing, and the remainder for pathological examination. The bacterial culture yielded negative results, while the pathological findings indicated lymphocyte, plasma cell, neutrophil, and eosinophil infiltration, consistent with acute suppurative inflammation (Figure 2).

TREATMENT

The patient received anti-osteoporotic treatment comprising salmon calcitonin injections (50 u intramuscularly, once daily), calcium supplementation (600 mg orally, twice daily), and calcitriol capsules (0.5 ug orally, once daily) following admission. Due to the absence of positive bacterial culture results, empiric antibiotic therapy with cefuroxime sodium (1.5 g intravenous infusion, every 12 h) was initiated. The patient’s visual analog scale (VAS) pain score decreased from eight points at admission to three points after nine days of treatment during hospitalization.

OUTCOME AND FOLLOW-UP

The patient continued treatment with intravenous cefuroxime sodium until erythrocyte sedimentation rate (ESR) and CRP levels normalized. Upon discharge, the patient transitioned to oral cefuroxime sodium for approximately two weeks. Oral calcium and vitamin D supplementation were continued, while calcitonin was discontinued and substituted with oral menatetrenone soft capsules. One and five months post-discharge, the patient returned to the hospital for lumbar MRI scans (Figure 1). At the five-month follow-up, the patient exhibited a VAS score of zero for back pain and a Z-score of -1.94, as assessed by DXA of the lumbar spine, allowing for a return to normal life.

Table 1 Routine laboratory tests and bone metabolism

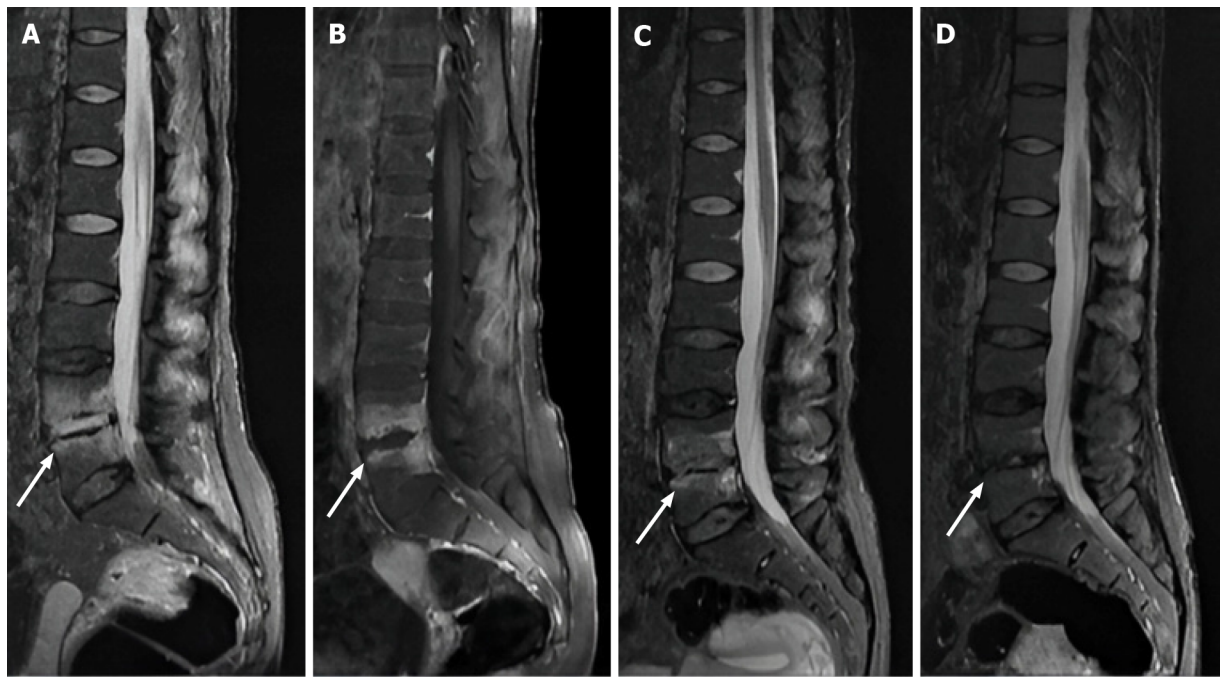
Project	CRP (mg/L)	ESR (mm/h)	WBC (10 ⁹ /L)	PCT (ng/mL)	25-OH-D (ng/mL)	PINP (ng/L)	β-CTX	OST (ng/L)	PTH (pg/mL)
Reference values	0-8	0-20	3.50-9.50	0-0.05	30-70	8.53-64.32	0.068-0.68	11-43	15-65
This case	8.43	25	4.98	0.04	12.96	62.74	1.430	22.21	12.0

Reference values were for non-pregnant lactating females. CRP: C-reactive protein; ESR: Erythrocyte sedimentation rate; WBC: White blood cell; PCT: Procalcitonin; 25-OH-D: 25 hydroxyvitamin D; PINP: Amino-terminal propeptide of type I collagen; OST: C-telopeptide of type I collagen; PTH: Parathyroid hormone.

Table 2 Serum calcium phosphorus and sex hormones

Project	AKP (U/L)	Ca (mmol/L)	P (mmol/L)	E2 (ng/L)	PROG (ug/L)	PRL (uIU/L)	LH (IU/L)	FSH (IU/L)
Reference values	35-100	2.08-2.60	0.74-1.52	41-398	0.121-12.0	102-496	14-95.6	4.7-21.5
This case	69	2.39	1.51	5.33	0.052	938.7	3.20	4.02

According to the last menstrual period, the patient was currently ovulatory with reference values of ovulatory female. AKP: Alkaline phosphatase; Ca: Serum calcium; P: Serum phosphorus; E2: Estrogen; PROG: Progesterone; PRL: Prolactin; LH: Luteinizing hormone; FSH: Follicle-stimulating hormone.



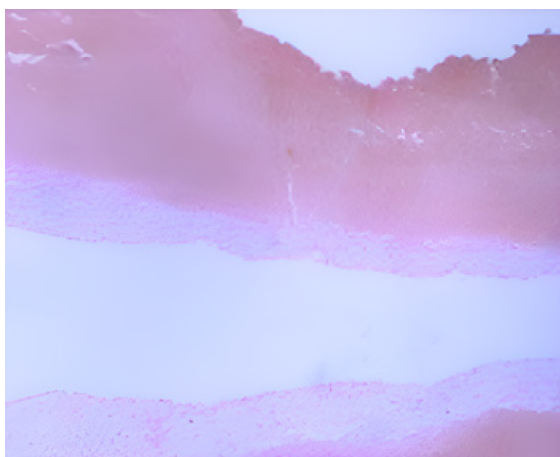
DOI: 10.12998/wjcc.v11.i17.4187 Copyright ©The Author(s) 2023.

Figure 1 This patient was a 34-year-old woman. A and B: Lumbar spine magnetic resonance imaging (MRI) and enhanced MRI revealed abnormal signals in the lower L4 vertebral body and upper L5 vertebral body, and the corresponding intervertebral space, which indicated lumbar infection (A: T2 fat-suppressing sequence; B: Enhanced scan); C: After one month of anti-osteoporosis and antibiotic treatment, the abnormal signal range get smaller and intensity was lower; D: At the five months follow-up, the abnormal signals scope contracted obviously and the signals of L4 and L5 vertebral bodies were nearly close to normal.

DISCUSSION

Previously, PLO was regarded as a rare disease; however, with increased awareness and recognition, the number of related studies has grown in recent years[2,12,13]. This study presents a case of PLO with PS, which is an uncommon clinical condition.

Currently, there is no consensus on PLO treatment, and clinical practice largely draws from postmenopausal osteoporosis management strategies[14]. Generally, patients with mild symptoms can cease breastfeeding and take oral calcium and vitamin D supplements. Those with severe symptoms or



DOI: 10.12998/wjcc.v11.i17.4187 Copyright ©The Author(s) 2023.

Figure 2 The patient underwent an L5 puncture biopsy under X-ray guidance after admission. Pathology showed that lymphocytes, plasma cells, neutrophils, and eosinophils were found in lesions, which was consistent with the pathological changes of acute suppurative infection.

significant osteoporosis may be advised to incorporate anti-osteoporotic medications such as bisphosphonates, calcitonin, and teriparatide[15,16]. In this patient's case, although infection was confirmed, the association between low back pain and osteoporosis remained unclear. Given the severity of the patient's low back pain upon admission, calcitonin-based medications with superior analgesic properties were initially chosen. Bisphosphonates, commonly used for PLO treatment, were not selected due to concerns about their long-term deposition in bone and potential impact on the fetus in subsequent pregnancies[17], as the patient was in her first pregnancy and intended to conceive again in the future.

For patients diagnosed with PS, a pathogenic diagnosis should be obtained to inform the clinical use of antibiotics. In this case, the patient's lack of fever or chills complicated the acquisition of bacteriological results from blood culture, prompting a puncture to collect tissue for pathogenic bacteria identification. Following the negative bacteriological findings, second-generation cephalosporin antibiotics were empirically chosen for treatment, given that Gram-positive bacteria are the most common pathogens in PS cases[18]. The selected antibiotics proved to be sensitive and effective, as evidenced by changes in ESR, CRP, and clinical symptoms after treatment.

In examining the relationship between pregnancy and PS, the literature has yet to identify pregnancy or lactation as risk factors for PS. Although some case reports have documented spinal tuberculosis[10, 19] and PS[11] during pregnancy, a clear correlation between these conditions remains to be established. Pregnancy prompts physiological, hormonal, and immune system changes that create a unique, complex environment to protect both mother and fetus from pathogens. While there is no direct evidence indicating maternal immune system suppression during pregnancy, an increased risk of certain infections, such as those of the urinary and respiratory systems, has been observed[20,21]. Consequently, the incidence of potential PS during pregnancy might also be elevated.

The association between osteoporosis and PS has received limited attention in previous research. Bettag *et al*[22] found a high coexistence rate between osteoporosis and PS, which could be attributed to shared risk factors for both conditions. In their clinical practice, they noted a high incidence of internal fixation loosening following PS surgery. To determine whether this was related to osteoporosis, they conducted a retrospective analysis of 200 patients with PS who had undergone surgery. By assessing thoracolumbar spine computed tomography (CT) scans and measuring BMD using vertebral CT values, they discovered that 95 of the 200 patients (48%) exhibited preoperative osteoporosis. Although the underlying mechanism remains unclear, Bettag *et al*[22] emphasized that both osteoporosis and PS share risk factors such as smoking, oral glucocorticoid use, and malnutrition. Similarly, studies on PLO have demonstrated that smoking, glucocorticoid use, malnutrition, and low BMI are risk factors for PLO[12, 14], suggesting a possible link between PLO and PS development. In addition, some underlying factors such as environment, metabolism, and diet factors may also contribute to osteoporosis in patients. Recent studies have shown that cadmium exposure and nonalcoholic fatty liver disease in adolescents are inversely correlated with BMD[23,24], while caffeine intake in children and adolescents is positively correlated with BMD[25]. However, further research is needed to confirm the effects of these factors specifically in patients with the PLO.

CONCLUSION

In summary, the concurrent presence of PLO and septic spondylitis can be easily overlooked, making early MRI examination crucial. As PLO and septic spondylitis share common risk factors, a potential correlation between the two conditions may exist. Future studies should investigate the specific coexisting incidence and the mechanisms underlying this association.

FOOTNOTES

Author contributions: Zhai K is responsible for writing the manuscript; Wang L followed up the patients; Wu AF and Qian Y performed the research; Huang WM provided this idea and case, and reviewed the manuscript; and all authors have read and approve the final manuscript.

Informed consent statement: Informed written consent was obtained from the patients for publication of this report and any accompanying images.

Conflict-of-interest statement: All the authors report no relevant conflicts of interest for this article.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

Open-Access: This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

Country/Territory of origin: China

ORCID number: Kai Zhai 0009-0001-9610-2305; Wei-Min Huang 0000-0002-0769-8945.

S-Editor: Wang JJ

L-Editor: A

P-Editor: Wang JJ

REFERENCES

- 1 Kurabayashi T, Morikawa K. [Epidemiology and pathophysiology of post-pregnancy osteoporosis]. *Clin Calcium* 2019; **29**: 39-45 [PMID: 30590358]
- 2 Hardcastle SA, Yahya F, Bhalla AK. Pregnancy-associated osteoporosis: a UK case series and literature review. *Osteoporos Int* 2019; **30**: 939-948 [PMID: 30671611 DOI: 10.1007/s00198-019-04842-w]
- 3 Curtis EM, Parsons C, Maslin K, D'Angelo S, Moon RJ, Crozier SR, Gossiel F, Bishop NJ, Kennedy SH, Papageorgiou AT, Fraser R, Gandhi SV, Prentice A, Inskip HM, Godfrey KM, Schoenmakers I, Javaid MK, Eastell R, Cooper C, Harvey NC; MAVIDOS Trial Group. Bone turnover in pregnancy, measured by urinary CTX, is influenced by vitamin D supplementation and is associated with maternal bone health: findings from the Maternal Vitamin D Osteoporosis Study (MAVIDOS) trial. *Am J Clin Nutr* 2021; **114**: 1600-1611 [PMID: 34297067 DOI: 10.1093/ajcn/nqab264]
- 4 Butscheidt S, Tsourdi E, Rolvien T, Delsmann A, Stürznickel J, Barvencik F, Jakob F, Hofbauer LC, Mundlos S, Kornak U, Seefried L, Oheim R. Relevant genetic variants are common in women with pregnancy and lactation-associated osteoporosis (PLO) and predispose to more severe clinical manifestations. *Bone* 2021; **147**: 115911 [PMID: 33716164 DOI: 10.1016/j.bone.2021.115911]
- 5 Leere JS, Vestergaard P. Calcium Metabolic Disorders in Pregnancy: Primary Hyperparathyroidism, Pregnancy-Induced Osteoporosis, and Vitamin D Deficiency in Pregnancy. *Endocrinol Metab Clin North Am* 2019; **48**: 643-655 [PMID: 31345528 DOI: 10.1016/j.ecl.2019.05.007]
- 6 Raffaetà G, Mazzantini M, Menconi A, Bottai V, Falossi F, Celauro I, Guido G. Osteoporosis with vertebral fractures associated with pregnancy: two case reports. *Clin Cases Miner Bone Metab* 2014; **11**: 136-138 [PMID: 25285145 DOI: 10.11138/ccmbm/2014.11.2.136]
- 7 Jun Jie Z, Ai G, Baojun W, Liang Z. Intertrochanteric fracture in pregnancy- and lactation-associated osteoporosis. *J Int Med Res* 2020; **48**: 300060519858013 [PMID: 31256731 DOI: 10.1177/0300060519858013]
- 8 Waheed G, Soliman MAR, Ali AM, Aly MH. Spontaneous spondylodiscitis: review, incidence, management, and clinical outcome in 44 patients. *Neurosurg Focus* 2019; **46**: E10 [PMID: 30611166 DOI: 10.3171/2018.10.FOCUS18463]
- 9 Babic M, Simpfendorfer CS. Infections of the Spine. *Infect Dis Clin North Am* 2017; **31**: 279-297 [PMID: 28366222 DOI: 10.1016/j.idc.2017.01.003]
- 10 Nigam A, Prakash A, Pathak P, Abbey P. Bilateral psoas abscess during pregnancy presenting as an acute abdomen: atypical presentation. *BMJ Case Rep* 2013; **2013** [PMID: 24148941 DOI: 10.1136/bcr-2013-200860]

- 11 **Bajwa ZH**, Ho C, Grush A, Kleefield J, Warfield CA. Discitis associated with pregnancy and spinal anesthesia. *Anesth Analg* 2002; **94**: 415-416, table of contents [PMID: [11812710](#) DOI: [10.1097/00000539-200202000-00035](#)]
- 12 **Qian Y**, Wang L, Yu L, Huang W. Pregnancy- and lactation-associated osteoporosis with vertebral fractures: a systematic review. *BMC Musculoskelet Disord* 2021; **22**: 926 [PMID: [34732196](#) DOI: [10.1186/s12891-021-04776-7](#)]
- 13 **Chaniotakis C**, Koutserimpas C, Raptis K, Zafeiris E, Alpantaki K, Effraimidis G. Pregnancy associated osteoporotic vertebral fractures: an underdiagnosed condition of back pain. *J Musculoskelet Neuronal Interact* 2021; **21**: 332-334 [PMID: [34059580](#)]
- 14 **Tuna F**, Akleylek C, Özdemir H, Demirbağ Kabayel D. Risk factors, fractures, and management of pregnancy-associated osteoporosis: a retrospective study of 14 Turkish patients. *Gynecol Endocrinol* 2020; **36**: 238-242 [PMID: [31385717](#) DOI: [10.1080/09513590.2019.1648417](#)]
- 15 **Lampropoulou-Adamidou K**, Trovas G, Triantafyllopoulos IK, Yavropoulou MP, Anastasilakis AD, Anagnostis P, Toulis KA, Makris K, Gazi S, Balanika A, Tournis S. Teriparatide Treatment in Patients with Pregnancy- and Lactation-Associated Osteoporosis. *Calcif Tissue Int* 2021; **109**: 554-562 [PMID: [34132853](#) DOI: [10.1007/s00223-021-00871-y](#)]
- 16 **Ijuin A**, Yoshikata H, Asano R, Tsuburai T, Kikuchi R, Sakakibara H. Teriparatide and denosumab treatment for pregnancy and lactation-associated osteoporosis with multiple vertebral fractures: A case study. *Taiwan J Obstet Gynecol* 2017; **56**: 863-866 [PMID: [29241936](#) DOI: [10.1016/j.tjog.2017.10.028](#)]
- 17 **Vujasinovic-Stupar N**, Pejnovic N, Markovic L, Zlatanovic M. Pregnancy-associated spinal osteoporosis treated with bisphosphonates: long-term follow-up of maternal and infants outcome. *Rheumatol Int* 2012; **32**: 819-823 [PMID: [21327429](#) DOI: [10.1007/s00296-011-1816-z](#)]
- 18 **Nakamura T**, Morimoto T, Katsube K, Yamamori Y, Mashino J, Kikuchi K. Clinical characteristics of pyogenic spondylitis and psoas abscess at a tertiary care hospital: a retrospective cohort study. *J Orthop Surg Res* 2018; **13**: 302 [PMID: [30486831](#) DOI: [10.1186/s13018-018-1005-9](#)]
- 19 **Datta S**, Spencer J. Cutaneous tuberculosis in pregnancy. *J Obstet Gynaecol* 2004; **24**: 455 [PMID: [15203592](#) DOI: [10.1080/01443610410001696860](#)]
- 20 **Abu-Raya B**, Michalski C, Sadarangani M, Lavoie PM. Maternal Immunological Adaptation During Normal Pregnancy. *Front Immunol* 2020; **11**: 575197 [PMID: [33133091](#) DOI: [10.3389/fimmu.2020.575197](#)]
- 21 **Fuhler GM**. The immune system and microbiome in pregnancy. *Best Pract Res Clin Gastroenterol* 2020; **44-45**: 101671 [PMID: [32359685](#) DOI: [10.1016/j.bpg.2020.101671](#)]
- 22 **Bettag C**, Abboud T, von der Brelie C, Melich P, Rohde V, Schatlo B. Do we underdiagnose osteoporosis in patients with pyogenic spondylodiscitis? *Neurosurg Focus* 2020; **49**: E16 [PMID: [32738793](#) DOI: [10.3171/2020.5.FOCUS20267](#)]
- 23 **Xie R**, Liu Y, Wang J, Zhang C, Xiao M, Liu M, Zhang Y. Race and Gender Differences in the Associations Between Cadmium Exposure and Bone Mineral Density in US Adults. *Biol Trace Elem Res* 2022 [PMID: [36508128](#) DOI: [10.1007/s12011-022-03521-y](#)]
- 24 **Xie R**, Zhang Y, Yan T, Huang X, Xie S, Liu C, Liu M. Relationship between nonalcoholic fatty liver disease and bone mineral density in adolescents. *Medicine (Baltimore)* 2022; **101**: e31164 [PMID: [36253982](#) DOI: [10.1097/MD.00000000000031164](#)]
- 25 **Luo J**, Liu M, Zheng Z, Zhang Y, Xie R. Association of urinary caffeine and caffeine metabolites with bone mineral density in children and adolescents. *Medicine (Baltimore)* 2022; **101**: e31984 [PMID: [36626464](#) DOI: [10.1097/MD.00000000000031984](#)]



Published by **Baishideng Publishing Group Inc**
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

Telephone: +1-925-3991568

E-mail: bpgoffice@wjgnet.com

Help Desk: <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

