BRIEF REPORT

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A 26 years old primigravida woman presented with abdominal cutaneous entrapment syndrome: a case report

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Abstract

Background Abdominal cutaneous nerve entrapment syndrome (ACNES) is characterized by severe, mostly refractory, chronic pain due to the entrapment of the cutaneous branches of the lower torso intercostal nerves at the lateral edge of the rectus abdominis muscle. ACNES is rare compared to other pregnancy-related peripheral neuropathies and is often overlooked as a differential diagnosis for abdominal pain, despite the diagnosis relying primarily on patient history and physical examination. Emergency physicians and other medical personnel's lack of exposure to such cases results in unnecessary laboratory requests, repeated visits, and increased fear and tension for the patient.

Case presentation A 26-year-old primigravida on her second trimester of pregnancy presented to our Emergency department with persistent localized right upper quadrant abdominal pain. Despite repeated visit to the nearby hospital, no diagnosis was settled and the pain persisted. At our ED after a thorough history, physical examination and diagnostic test no abnormality was found. Finally Abdominal cutaneous nerve entrapment syndrome (ACNES) was considered and a mixture of 1 ml 2% lidocaine with adrenaline and 1 ml dexamethasone (4 mg) was infiltrated into the fascial plane in a fanning fashion into the most tender area using a modified technique and the patient reported significant improvement in pain.

Conclusion Abdominal cutaneous nerve entrapment syndrome (ACNES) is a cause of abdominal pain in pregnancy that is often overlooked. The objective of this study is to describe a rare case of ACNES in a 26-year-old primigravida woman who presented to a low-resource emergency department to assist patient management.

Keywords ACNES, Neuropathic pain, Pregnancy

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Background

Abdominal cutaneous nerve entrapment syndrome (ACNES) is a pain syndrome characterized by severe, mostly refractory, chronic pain caused by the entrapment of the cutaneous branches of the lower torso intercostal nerves at the lateral edge of the rectus abdominis muscle. Pregnancy is a known risk factor for this syndrome [1, 2]. It is characterized by severe, chronic pain resulting from the entrapment of cutaneous branches of the lower intercostal nerves at the rectus abdominis muscle's lower edge. The neurovascular structures within the rectus channel are encased in fat and connective tissue, allowing them to function independently. Various conditions that increase abdominal wall pressure can exacerbate the nerve entrapment, with anterior branches being most affected due to their angle of entry and distance from the spinal cord. Even if the epedimiology is not well-documented, but it is estimated to affect approximately 1-2% of patients presenting with chronic abdominal pain. [3, 13, 14]. ACNES is rare compared to other pregnancy-related peripheral neuropathies and is often under-considered as a differential diagnosis for abdominal pain, despite the diagnosis primarily relying on patient history and physical examination [2]. The lack of exposure to ACNES cases among emergency physicians and other medical personnel often results in unnecessary laboratory requests, repeated visits, and increased patient anxiety and fear [3, 4]. This lack of awareness leads to misdiagnosis or delayed diagnosis, causing further distress and prolonging patient suffering. The objective of this study is to describe a rare case of ACNES in a 26-year-old primigravida woman who presented to a emergency department to highlight the importance of early diagnosis for better patient treatment outcome and reduction of inappropriate health care cost.

Case presentation

A 26-year-old previously healthy primigravida woman presented to the University Teaching Hospital Emergency Department with a 19-day history of abdominal pain localized to the right upper part of her abdomen, just below the chest wall. The pain was persistent, localized, and burning in nature, aggravated by light touch, including contact with her clothing, and severe enough to awaken her from sleep. She had no history of trauma or accidents and denied having fever, dysuria, urgency, vomiting, headache, vision changes, or yellowish discoloration of the eyes and skin.

Initially, she visited a primary care general practitioner twice. During her first visit, laboratory results and vital signs were normal except for mild pain in the right upper quadrant and epigastric area, for which she was given unspecified oral painkillers. Despite this treatment, her pain persisted, leading her to seek care at another hospital. Again, she was evaluated similarly, and her laboratory tests returned normal. Subsequently, she was referred to our hospital for further evaluation.

Upon arrival at our emergency department, she underwent a thorough evaluation. Her vital signs were BP 110/80 mmHg, PR 65 bpm, RR 21 breaths per minute, and SpO2 98% on room air. Physical examination revealed superficial tenderness and hyperesthesia in her right upper quadrant, without rebound tenderness or changes in the overlying skin color. She was placed in the ED observation unit, and further workup was ordered.

Laboratory values showed that CBC, LFT, RFT, urine analysis, and viral markers for HBV and HCV were normal. Obstetric and abdominal ultrasounds showed a normal 21+2-week singleton fetus. She was informed that her symptoms might be due to neuropathic pain caused by the stretching effect of the growing uterus, a rare occurrence in pregnancy. After discussing the procedure and obtaining the patient's informed consent, a carefully prepared mixture was used to address the patient's symptoms. The mixture included 1 ml of 2% lidocaine with adrenaline, which acts as a local anesthetic to numb the area and reduce bleeding, and 1 ml of dexamethasone (4 mg), a corticosteroid that helps reduce inflammation and swelling. This solution was then meticulously infiltrated into the fascial plane-this is the connective tissue that surrounds muscles-targeting the most tender area identified during the examination. The infiltration was performed using a modified technique known as the "fanning fashion," where the needle is carefully moved in a sweeping motion to disperse the medication evenly across the area, ensuring comprehensive coverage. Immediately after the infiltration, the patient reported significant improvement, confirming the diagnosis.

After a 6-hour stay in the emergency department, she was reassured that a single injection often provides longterm relief and that repeated hospital visits are unnecessary unless the pain worsens, in which case another injection might be required. She was also informed that her condition is benign and that there is no need for concern. After arranging a follow-up phone consultation, she was discharged. At the one-month and two-month follow-up reviews, the patient was not experiencing anxiety despite the persistence of her pain. However, at the fivemonth follow-up review, which was at one month postpartum, the pain had completely resolved.

Discussion and conclusions

Abdominal Cutaneous Nerve Entrapment Syndrome (ACNES) occurs when the anterior cutaneous branch of the thoracoabdominal nerves (T7-T11) becomes trapped within the rectus abdominis muscle as it passes through its neurovascular channel. This entrapment can be due to hypothesized etiologies such as ischemia and chronic edema in conditions of raised intra-abdominal pressure,



Fig. 1 The patient pointing out the area where she suffers maximal pain



Fig. 2 "Dough rolling" to illicit intense pain

such as pregnancy and surgery [5–7]. In a large teaching hospital emergency department, ACNES accounted for nearly 2% of patients seen for acute abdominal pain [13]. Additionally, in the largest published case series on ACNES, 3% of cases were reported to have pregnancy as the provoking mechanism [2, 5]. However, epidemiological data are scarce in low-resource settings. The case presented indicates a mechanical mechanism for abdominal pain caused by a growing gravid uterus.

ACNES manifests as persistent, localized, burning abdominal wall pain, with highly sensitive overlying skin that can become severe with increases in intra-abdominal pressure (Fig. 1). Despite pregnancy being a known risk factor for ACNES and the diagnosis being reached through history and physical examination, including the typical "Carnett sign," few cases are reported in the pregnant population. Carnett's sign is where, the patient is asked to perform a straight-leg-raising maneuver (raising both legs off the table at the same time while supine) while the examiner's finger is on the painful site. Raising only the head while in the supine position can serve the same purpose. These maneuvers tighten the rectus abdominis muscles, increasing the pain from the



Fig. 3 Pinching up the soft tissue helps to avoid thoracoabdominal wall and viscera penetration fear

entrapped nerve. If the pain is increased or the same, the source of the patient's symptoms is most likely the abdominal wall, and Carnett's sign should be considered positive. If the pain is decreased, the origin of pain is likely from an intra-abdominal organ, as the tensed abdominal wall muscles protect the viscera. [14, 15]. This might be due to medical personnel's limited experience with this syndrome [1, 2, 5]. In this case, the intensification of pain during the "pinch test" and "dough rolling" maneuver (Fig. 2), as well as a positive "Carnett sign," increased the probability of ACNES.

A single syringe local injection of anesthetic and steroid agents confirms the diagnosis and provides shortand long-term relief of the syndrome [8]. Although no literature compares the injection dose or agent type of steroids, based on the safety profile and availability in our setup, we selected dexamethasone injection (1 ml, preparation 8 mg/2 ml) and lidocaine injection (1 ml, lidocaine and adrenaline injection LICAN 2%, each ml containing 24.64 mg lidocaine and 1 mg adrenaline), mixed in a single syringe. After taking safety precautions, the prepared steroid and anesthetic injection was administered into the pinched mound of the most painful tissue area using a modified technique (Fig. 3). Following the injection, the patient's pain was relieved.

Nowadays, an ultrasound-guided nerve block based on the site of pain is an alternative approach for diagnosis and treatment [9, 10]. ACNES, as an overlooked diagnosis, causes unnecessary expense in the healthcare system, exposes patients to possible hazards, and creates fear and stress for patients and their families [11, 12]. In this case, the patient was worried she was suffering from a dangerous, unidentified condition. Additionally, there was unnecessary cost due to repeated workups and hospital visits. However, studies on the incidence and impact of ACNES on healthcare systems in low-resource settings are scarce.

Abdominal cutaneous nerve entrapment syndrome (ACNES) is a cause of abdominal pain in pregnancy that is often overlooked. The diagnosis of ACNES is reached through thorough patient history and physical examination. However, many patients undergo unnecessary repeated laboratory tests, imaging, drug prescriptions, and procedures. This not only leads to increased health-care costs but also causes patients to suffer from anxiety and stress. The main aim of this case report is to highlight the importance of promoting awareness of this syndrome among medical personnel to reduce patient suffering and reduce unnecessary expenses in the healthcare system, particularly in low-resource settings.

Abbreviations

ACNES	Abdominal cutaneous nerve entrapment syndrome
ED	Emergency department
CBC	Complete Blood Count
LFT	Liver Function Test
RFT	Renal Function Test
BP	Blood Pressure
RR	Respiratory Rate
SPO2	Oxygen saturation
HBV	Hepatitis B Virus
HCV	Hepatitis C virus

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Author contributions

MAK - involved in the conception and design of the study, drafting and revising of the article and final approval of the version to be summited and also involved in direct management of the patient.MTB -involved in the conception and design of the study, drafting and revising of the article and final approval of the version to be submitted and also involved in direct management of the patient.ABT -involved in the conception and design of the study, drafting and revising of the study, drafting and revising of the study, drafting and revising of the article and final approval of the version to be submitted. ATT- involved in the conception and design of the study, drafting and revising of the article and final approval of the version to be submitted. ATT- involved in the conception and design of the study, drafting and revising of the article and final approval of the version to be submitted. AMB- involved in the conception and design of the study, drafting and revising of the article and final approval of the version to be submitted. AMB- involved in the conception and design of the study, drafting and revising of the article and final approval of the version to be submitted.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Ethical approval for this study was obtained from tee College Research Committee and Reference No. HSE/00429/2012 and we certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. Written informed consent was obtained from all participants.

Consent for publication

Informed written consent for publication was taken from the patient before preparing this case report.

Competing interests

The authors declare no competing interests.

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