

Interrogating ‘Round Ligament Pain’ and introducing ‘Pregnancy-Related Abdominal Wall Neuropathy’: a cohort study.

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April 16, 2024

Abstract

Objective: 1. Measure pregnant people’s experience of unexplained abdominal pain, their recognition of ‘Round Ligament Pain’ (RLP) and whether medical carers are providing this education. 2. Describe the features of participants’ unexplained abdominal pain and their crossover with those of abdominal wall pain (AWP), a treatable condition. **Design:** Prospective observational cohort. **Setting:** Single antenatal clinic in New Zealand. **Population:** 203 pregnant adults over 20 weeks’ gestation. **Method:** Written questionnaire. **Main Outcome Measures:** Presence of unexplained abdominal pain in pregnancy, knowledge of RLP, source of information on RLP and the descriptors participants used for their pain. **Results:** Objective 1. The majority had experienced unexplained abdominal pain in pregnancy (68.5%). Recognition of RLP was common (54%). Those with unexplained abdominal pain had an odds ratio of 9.23 of citing a medical carer as their RLP information source when compared to those without pain (95% CI 3.5-24.4). Objective 2. Most participants used multiple AWP descriptors, with a mean number of 4.06/10 (95% CI 3.71-4.41). Descriptors with the highest frequency of clustering with others were “pain worsened by lightly pushing on the painful area” (6.71/10, 95% CI 5.94–7.49), followed by “when in pain, sensation over the painful area feels different” (5.78/10, 95% CI 4.68-6.88). **Conclusions:** Unexplained abdominal pain in pregnancy is common and medical carers continue to cite RLP. Our participants’ unexplained abdominal pain shared many historical features with AWP. **Funding:** Nil sought. **Keywords:** Round ligament pain, abdominal wall pain, Anterior Cutaneous Nerve Entrapment Syndrome (ACNES), Pregnancy-Related Abdominal Wall Neuropathy (PRAWN), neuropathic pain.

Introduction

Unexplained abdominal pain in pregnancy is common. While many find this pain trivial, for some it is severe and prolonged. Our 2020 in-hospital audit of the obstetric emergency department revealed that non-visceral abdominal pain accounted for 3.4% of all presentations that year*.

‘Round Ligament Pain’ (RLP) has been described as one of the commonest ailments of pregnancy. This abdominal pain has been traditionally attributed to the stretching of the uterine round ligaments during pregnancy. There is little anatomical support for this idea, as there is only one branch of the genitofemoral nerve running through the ligament. It is routinely ligated at hysterectomy with no recognised sequelae. RLP is described in medical textbooks such as the Oxford Handbook of Obstetrics and Gynaecology (1). However, apart from occasional mentions in review articles (2-4) and a description of helpful stretches to alleviate RLP(5) it is nowhere to be seen in peer-reviewed English Language scientific literature. A search through online databases PubMed, Google Scholar and the Cochrane Central Register of Controlled Trials yielded no other results.

*Unpublished data.

Abdominal Wall Pain (AWP) and its subgroup of Anterior Cutaneous Nerve Entrapment Syndrome (ACNES) are easily diagnosed and immediately treatable pathologies (6). It is thought to account for 10% of chronic abdominal pain in the outpatient setting and has a reputation in the literature for being underrecognised

(7). The aetiology is that the thoracic and anterior cutaneous nerves make 90° turns through the posterior abdominal wall sheath in fibrous rings to provide cutaneous sensation to the midline anterior abdomen. Irritation or entrapment of these nerves provokes pain (7).

As the growing gravid uterus exits the pelvic cavity at 12 weeks' gestation, it is logical that a pain condition related to the displacement of the nerves of the abdominal wall could be provoked by a distending pregnant abdomen. To date, only single case reports of AWP in pregnancy have been published (10-12). We are currently writing a case series of the successful treatment of 19 pregnant patients at our hospital with AWP over the last 18 months.

Objective 1. Determine the proportion of participants experiencing pain, having knowledge of RLP and the source of that information. Objective 2. Describe whether participants' pain fit any of the ten descriptors for AWP, which were then ranked according to their frequency of clustering with other descriptors.

Materials and Methods

This is a single centre, prospective, observational cohort study of patients attending antenatal clinic at a tertiary hospital in the North Island of New Zealand. 203 pregnant people were surveyed anonymously using a written questionnaire. No funding was sought.

The primary outcomes were the incidence of unexplained abdominal pain in pregnancy and awareness of 'Round Ligament Pain'. Secondary outcomes were the source of the patients' education about RLP, the frequency of AWP descriptors used and the accumulation of AWP descriptors. Data are presented in percentages, means, standard deviations, odds ratios and 95% confidence intervals.

The survey consisted of seven questions over one A4 page. Five of the questions were multiple choice, two were free text. Antenatal clinic staff approached patients, who then independently completed the written questionnaire and submitted it to the response box that was cleared daily.

Recruitment occurred between July and September 2021. To be included, subjects had to provide informed written consent, speak English or have a formal interpreter present, be at least 20 weeks' pregnant and be 18 years of age or older

Results

After initially planning for 200 respondents, we overrecruited to 203. The mean participant age was 32.1 years. There were no incomplete questionnaires.

Māori made up 34% of participants. New Zealand Europeans: 40.4% and Pacific peoples: 3.4%. The third most common ethnicity was Indian at 6.9%. Other ethnicities constituted the remaining 15.3%.

Recognition of RLP:

54% (109/203) of the participants had heard of RLP before. As shown in figure 1, of those who had heard of RLP 59.6% (65/109) heard about it from a medical carer. 56.9% (62/109) had heard about it online and 14.7% (16/109) heard about it from whānau (Te Reo Māori for extended family), family and friends. For other sources, one participant cited podcasts, and another identified the smartphone applications 'What to Expect' and 'Baby Tracker' as their source.

Prevalence of Unexplained Abdominal Pain in Pregnancy:

Unexplained abdominal pain in pregnancy was common, and was reported by 68.5% (139/203) of participants. 53.7% (109/203) of participants had heard of RLP. 43.9% (61/139) of participants with pain had heard about RLP from a medical carer compared to only 7.8% (5/64) of participants without pain, giving an odds ratio 9.23 (95% CI 3.5-24.4).

Time Frame for Unexplained Abdominal Pain in Pregnancy:

The time frame was a free text question. This yielded varied replies, of which 12 of the 127 responses were imprecise. Of the 115 remaining (Table 1), while 65.2% reported pain that lasted 30 minutes or less, 34.8% described a duration of hours to weeks.

Features of Abdominal Wall Pain on History:

The questionnaire included a list of ten key descriptors which supported a diagnosis of AWP (Table 2). Nine of these features were condensed from a 2012 publication from van Assen and colleagues (9). The tenth descriptor was derived from our observation that pregnant patients with AWP often describe pain that worsened with fetal movement. For the 139 participants who had unexplained abdominal pain in pregnancy, the average number of symptom descriptors supporting a diagnosis of AWP was 4.06/10 (St dev 2.12, 95% CI 3.71-4.41). Only 1.4% (2/139) of participants with pain had no symptom descriptors of AWP.

As seen in Table 2, The most commonly used AWP descriptor was pain that is “worsened by walking, bending, moving to sit” (72.6%), followed by pain of a “sharp” quality (56.8%), then pain that is “always in the same location” and pain that is “worsened by coughing, laughing, pushing to defecate” (both 45.3%).

Additionally, the number of AWP descriptors each participant used was calculated (Table 2). It was found that participants describing pain that was worsened by lightly pushing the overlying skin used the highest number of other descriptors supporting a diagnosis of AWP at 6.71/10. (st dev 1.82, 95% CI 5.94–7.49). Participants with altered sensation overlying the painful area had an average of 5.78/10 AWP descriptors (st dev 2.75, 95% CI 4.68-6.88) Participants with pain they described as originating from just beneath the skin had an average of 5.63/10 AWP descriptors (st dev 2.16, 95% CI 4.9-6.37).

Māori results:

As per the 2018 census, 23.9% of the population in the catchment area of the tertiary hospital are of Māori ethnicity. 34% of our respondents were Māori. Overall, as shown in Table 3, Māori participants were younger than non-Māori. They were less likely to have heard about RLP and had lower rates of unexplained abdominal pain than non-Māori. Māori who had heard of RLP were more likely to have heard about it online rather than from a medical carer. Māori participants were more likely to cite whānau, family and friends as a source of information compared to non-Māori.

Discussion:

Main Findings

The majority of our participants had experienced unexplained abdominal pain in pregnancy, often for prolonged periods of time. The finding that participants with unexplained abdominal pain in pregnancy had an odds ratio of 9.23 to have been told about RLP by a medical carer than those without pain strongly suggests that the conciliatory tale of RLP is still commonly told in clinical practice, despite there being no supportive evidence.

When describing their pain, 98.6% of participants used descriptors for AWP. The commonest AWP descriptor used by participants used was ‘pain worsened by walking, bending, moving to sit’. When examining patients with suspected AWP, Carnett’s test is essential. This involves deep palpation to the painful area of the abdomen while the patient moves from lying to sitting or does a straight leg raise. The test is positive if the pain is exacerbated.

Most participants used multiple AWP descriptors, with a mean number of 4.06/10. The AWP descriptors our participants used that were associated with the most clustering with others was ‘pain worsened by lightly pushing on the affected area’ and ‘when in pain, sensation over the painful area feels different’. This can be elicited on exam where patients find that their pain is triggered by light touch, or that the sensation of ice applied to area feels altered.

While this study was not designed to diagnose our participants as having AWP, it does complement the theory that AWP is likely more common than is currently appreciated in obstetrics. We have labelled the

process Pregnancy-Related Abdominal Wall Neuropathy (PRAWN). In the 18 months since we learned of AWP, we have successfully diagnosed and treated 19 pregnant patients with PRAWN with transabdominal plane (TAP) blocks – an immediately effective and diagnostic analgesia that can be long-lasting.

Strengths

This is the first formal investigation into a pain condition experienced by the majority of pregnant people - it is an introduction, rather than a conclusion to the problem. We have clearly demonstrated the high frequency of unexplained abdominal pain and of sufferers being told about RLP by medical carers. This indicates a gap in care that demands further attention.

To our knowledge, this is also the first attempt to propose an anatomically rational alternative explanation for ‘Round Ligament Pain’. The value of PRAWN lies not in the semantics of naming the correctly affected nerve, but rather in its therapeutic potential. In the non-pregnant community, AWP can be treated with TAP blocks, trigger point injections with steroid, chemical neurolysis and surgical neurectomies (20). The opportunities for these therapies to be extended to pregnant patients abound.

Limitations

In future research, we will not use prose for participant responses regarding pain duration. We recommend using only multiple choice lists.

The questionnaire we sourced for nine out of our ten history features of abdominal wall neuropathy was not generated for this purpose. It was written to help delineate between Irritable Bowel Syndrome and ACNES (9). It also does not describe the symptoms in terms of their specificity for ACNES, but rather the percentage of patients with ACNES using these descriptors.

There are other pain processes which pregnant people encounter which may have skewed our responses. Participants may have responded positively with descriptions of their pelvic girdle pain, symphysis pubis disfunction and uterine contractions. For this reason, any future studies on the subject should involve a Delphi method for questionnaire development and clinician-guided participant interviews.

Of clinical note, dysesthesia and allodynia are also features of central sensitisation, a complex pain syndrome involving amplification of pain by central nervous system mechanisms (21). It is advisable to ask patients if they suffer from chronic abdominal pain outside of pregnancy. The impact of central sensitisation on the therapeutic effect of a TAP block is as yet unknown.

Interpretation

Clinician fixation on visceral abdominal pain at the exclusion of somatic abdominal wall pain as a differential diagnosis leads to protracted testing, unsatisfactory treatment and substantial cost – both in terms of healthcare finance and patient suffering (7, 14-19). Accurately placed local anaesthetic injections give immediate, substantial pain relief to more than 75% of patients with AWP, often for prolonged periods of time (7). The topic is frequently discussed in publications related to gastroenterology, paediatrics, pain, emergency medicine and general surgery (7-9, 15-17, 22). This study suggests that AWP could be relevant for obstetric patients too.

New Zealand’s antenatal healthcare model is multidisciplinary. The patient’s Lead Maternity Carer provides all routine antenatal visits. These are most often midwives, but can be general practitioners or obstetricians. It is routine for low risk patients to never meet a doctor during their pregnancy and for high risk patients to receive most of their care from obstetricians. Patients with abdominal pain in pregnancy often have consultations with physiotherapists or pain physicians. Participants in this study were recruited from obstetric clinics. We emphasise that when participants label ‘medical carers’ as the source of their education on RLP, we are not indicting one discipline over another. The interrogation of the concept of RLP should be shared amongst all obstetric clinicians.

Taking a history and examining patients with abdominal wall neuropathy is efficient and rewarding. We

encourage obstetricians to ask their patients in pain the abovementioned questions and examine them looking for allodynia, hyperalgesia, dysesthesia and pain on abdominal wall tensing. A diagnostic and therapeutic ultrasound-guided TAP block is low risk and easy to perform (7).

Conclusion

Unless supportive evidence can be found, medical carers should stop referring to RLP. Unexplained abdominal pain in pregnancy warrants further research. Our hypothesis is that AWP contributes to a significant burden of suffering for pregnant people. We will explore this with our case series of successfully treated PRAWN patients and a prospective audit applying an enhanced questionnaire to all patients in our obstetric emergency department with unexplained abdominal pain.

Disclosure of interests:

We declare we have no conflict of interests.

Contribution to Authorship:

Conception, design and development, questionnaire development, preparation of tables, initial draft of manuscript: ET. Recruitment: all authors. Data collection: ET, HHA, Manuscript review: all authors.

Details of ethics approval:

After cultural consultation, the study received approval from Waikato District Health Board's Te Puna Oranga Māori Health Service. It was approved by the New Zealand Central Health and Disability Ethics Committee on the 9th of June, 2021 with the reference: 21/CEN/133. All participants provided written informed consent to participate in the study.

Acknowledgements:

Dr Isabel Camaño is the Clinical Director of Obstetrics at Waikato Hospital and we are grateful for her support and governance. Thank you to Dr Tanne Daniels, who recruited participants. We thank the midwives and reception staff from the antenatal clinic for their vital promotion of the study.

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