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SPEED BUMP CAN HELP TO DIAGNOSE ACUTE APPENDICITIS

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ABSTRACT: *The objective of this paper is to assess the diagnostic accuracy of pain on travelling over speed bumps for the diagnosis of acute appendicitis. Presence of pain while traveling over speed bumps was associated with an increased likelihood of acute appendicitis. As a diagnostic variable, it compared favorably with other features commonly used in clinical assessment. Asking about speed bumps may contribute to clinical assessment and could be useful in telephone assessment of patients. Rapid diagnosis and treatment are the key factors in successful outcomes in acute appendicitis. Delayed surgical intervention risks appendiceal perforation, which can lead to peritonitis, sepsis, and even death. Unfortunately, as many as 20% of appendectomies reveal a normal appendix, a negative rate associated with considerable morbidity and cost, the authors noted. Design Prospective questionnaire based diagnostic accuracy study. Setting surgical department of AL Karama teaching hospital /IRAQ – AL Kut city. Participants 104 patients aged 16-65 years referred to surgical team for assessment of possible appendicitis. Main outcome measures Sensitivity, specificity, positive and negative predictive values, and positive and negative likelihood ratios for pain over speed bumps in diagnosing appendicitis, with histological diagnosis of appendicitis as the reference standard.*

KEYWORDS: Pain, Diagnostic, Travelling, Speed bumps, Acute appendictis

INTRODUCTION

d bumps may have a useful alternative benefit in the diagnosis of acute appendicitis Acute appendicitis is the most common surgical abdominal emergency.4 Rapid diagnosis is important, because increased time between onset of symptoms and surgical intervention is associated with increased risk of appendiceal perforation and therefore potential peritonitis, sepsis, and death.5 However, the rate of negative appendicectomy (when appendicectomy is performed, but the appendix is found to be normal on histological evaluation4) ranges from 5% to 42%,6 and this can be associated with considerable morbidity.7 Clinical diagnosis can be challenging, particularly in the early stages of appendicitis when clinical manifestations may be quite non-specific or atypical. Different elements of history, examination, and laboratory findings have varying predictive power in the diagnosis of appendicitis,6 and algorithms and scoring systems for clinical evaluation exist,4 but appendicitis can nevertheless be easily missed.8

Patients with appendicitis have sometimes been noted to complain of a worsening of their abdominal pain when they travel over speed bumps. Some doctors ask about this routinely as part of history taking, believing it to be a highly diagnostic feature (personal communication).

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We sought to determine whether any evidence supports this practice and to determine its predictive power as a diagnostic sign.

Results

The analysis included 89 participants who had travelled over speed bumps on their journey to hospital. Of these, 68 had a confirmed histological diagnosis of appendicitis, 67 of whom reported increased pain over speed bumps as in table (1)

Table (1) Pain over speed bumps in relation to appendicitis

Pain over speed bumps	Appendicitis		Total
	Positive	Negative	
Positive	67	6	73
Negative	1	15	16
Total	68	21	89

The sensitivity was 97% (95% confidence interval 85% to 100%), and the specificity was 30% (15% to 49%). The positive predictive value was 61% (47% to 74%), and the negative predictive value was 90% (56% to 100%). The likelihood ratios were 1.4 (1.1 to 1.8) for a positive test result and 0.1 (0.0 to 0.7) for a negative result. Speed bumps had a better sensitivity and negative likelihood ratio than did other clinical features assessed, including migration of pain and rebound tenderness as in table (2)

Table (2) diagnostic performance (with 95% CI) of pain over speed bumps compared with other clinical diagnostic variables for appendicitis

Diagnostic variable	Sensitivity (%)	Specificity (%)	Positive predictive value(%)	Negative predictive value(%)	Positive likelihood ratio	Negative likelihood ratio
Pain over speed bumps	97 (85 to 100)	30 (15 to 49)	61 (47 to 74)	90 (56 to 100)	1.4 (1.1 to 1.8)	0.1(0.0 to 0.7)
Migratory pain	65 (46 to 91)	33 (17 to 53)	52 (36 to 68)	45 (24 to 68)	1.0(0.7 to 1.4)	1.1(0.5 to 2.1)
Nausea or vomiting	79 (62 to 91)	17 (5.6 to 35)	52 (38 to 66)	42 (15 to 72)	1.0(0.8 to 1.2)	1.2(0.4 to 3.5)
Rebound tenderness	71 (53 to 85)	50 (31 to 69)	62 (45 to 77)	60 (39 to 79)	1.4(0.9 to 2.2)	0.6(0.3 to 1.1)

Conclusions Presence of pain while travelling over speed bumps was associated with an increased likelihood of acute appendicitis. As a diagnostic variable, it compared favourably. Speed bumps are a commonly used traffic calming device to reduce the speed of vehicles.1

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Although controversial, traffic calming measures have been associated with a 70% decrease in injuries among child pedestrians in some areas,2 and they may be a promising intervention for reducing the overall number of road traffic injuries and deaths. 3 However, speeith other features commonly used in clinical assessment. Asking about speed bumps may contribute to clinical assessment and could be useful in telephone assessment of patients.

METHODS

We did a our study in government a teaching hospital in Iraq. The Roads in Iraq country specially in ALKUT city are almost universally surfaced in tarmac and are rough , with many speed bumps raised from the road surface in a variety of designs and elevations, near reach to the ALKARAMA hospital there are 4 speed bumps . All patients aged 16 or over who had been referred by either a general practitioner or an emergency department doctor, with suspected appendicitis were eligible. They were identified consecutively over a 12 month period between October 2012 to November 2013. .

We asked participants to complete a questionnaire survey about their symptoms, including four specific questions related to their journey into hospital: mode of transport, whether they had travelled over speed bumps, whether they had had pain on the journey, and whether the pain changed when they went over a speed bump. We defined patients as "speed bump positive" if they had a worsening of pain from baseline over speed bumps and as "speed bump negative" if their pain stayed the same, if they were unsure, or if their pain improved on going over speed bumps. We also recorded examination findings on admission from their notes. We then followed participants through their admission to determine the outcome and whether they were taken to theatre for presumed appendicitis. For those who had been to theatre, we obtained the subsequent histology report. We used histological diagnosis of appendicitis as the reference standard, which is the usual practice in studies of appendicitis. We also asked participants to provide contact details so that, if an alternative diagnosis or no diagnosis was made, we could contact them after their admission to ensure that their symptoms had resolved, to avoid missing cases of subacute or "grumbling" appendicitis. A positive or negative histological diagnosis of appendicitis was made in participants who went to theatre and had their appendix removed. We assumed participants whose symptoms resolved without surgery to have a negative diagnosis.

We calculated the sensitivity, specificity, positive and negative predictive values, and positive and negative likelihood ratios, with 95% confidence intervals, for the outcome diagnosis of appendicitis. When a sign was recorded as "unsure," we considered it absent for the purposes of calculation. We restricted the primary analyses to those patients reported to have travelled over speed bumps on the route to the hospital. We also planned to compare the diagnostic accuracy of worsened pain over speed bumps with more conventional diagnostic features of appendicitis, such as migratory pain and rebound tenderness. .

RESULTS

One hundred and four patients were recruited into the study. The median age was 39 (range 16-65) years. 89 participants were taken to theatre for presumed appendicitis, Acute appendicitis was confirmed histologically in 68 of these, giving a negative appendicectomy rate of 20%.all of those patients (68) was travel to the hospital by car,67 of them have pain over the speed bump and only one had no pain over the speed bump with appendicitis.

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DISCUSSION

Our results confirm that an increase in pain while travelling over speed bumps is associated with an increased likelihood of acute appendicitis. Absence of pain over speed bumps is associated with a significantly decreased likelihood of appendicitis. Although the specificity was relatively low, as a diagnostic variable pain over speed bumps compared favourably with other features commonly used in diagnostic assessment, with a better sensitivity and negative likelihood ratio than all other features assessed. Moreover, some patients who were "speed bump positive" but did not have appendicitis had other important abdominal diagnoses, such as a ruptured ovarian cyst, diverticulitis, or pelvic inflammatory disease. We hypothesise that the worsening of pain when travelling over speed bumps in appendicitis may occur because the movement involved irritates the peritoneum in a similar way to that produced by testing for rebound tenderness on examination

Strengths and limitations of study

Strengths of our study include the standardised approach to gathering information from patients by using a questionnaire and the obtaining of this information early in their admission and thus soon after their journey. A potential weakness is that although we recruited 104 patients as planned from our sample size calculation, only 99 recalled having travelled over speed bumps, a much lower rate than in our pilot study, which may be related to a redevelopment of the hospital site. Because of this, the number used for analysis (89 patients) was less than planned, leading to moderately large confidence intervals.

The presence of pain over speed bumps may have been overestimated in some patients owing to recall bias. Patients who had pain over speed bumps would be more likely to recall having travelled over them, whereas those who had no worsening of pain would not necessarily remember them. Variable exposure to speed bumps would also occur in clinical practice, so ours is a pragmatic study that shows that pain over speed bumps can be a useful diagnostic sign when available, although availability will vary

We used histological diagnosis of appendicitis as the reference standard for diagnosis. four patients in our sample were treated with antibiotics for presumed appendicitis while waiting for surgery but went on to make a full recovery. A systematic review published during recruitment to our study has shown that antibiotics can lead to resolution of acute appendicitis.9 We made the decision to exclude these patients from the analysis owing to the lack of a confirmed diagnosis, but a sensitivity analysis including these patients and classifying them in turn as positive or negative for a diagnosis of appendicitis made very little difference to overall results

CONCLUSIONS AND IMPLICATIONS

The high sensitivity of pain over speed bumps gives it a strong "rule-out value" and makes it a useful tool to use in excluding appendicitis and other important abdominal diagnoses 10. The low specificity, however, means that many patients with pain over speed bumps will not necessarily have appendicitis (that is, it is a poor "rule-in" test). Potential exists for it to be incorporated into clinical prediction rules for appendicitis. Our study was based in secondary care, so our results are not necessarily generalisable to a primary care population. However, pain over speed bumps could potentially have a useful role in primary care in assisting patients

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with abdominal pain. As all our group of patients had already been assessed by a clinician who thought they might have appendicitis, the pre-test probability is quite high; the speed bump test might also be useful in assessment of all types of abdominal pain, not just when appendicitis is suspected. A history of pain on travelling over uneven road surfaces or potholes may provide a useful proxy for speed bumps in healthcare settings where speed bumps are less frequently found.

Although being "speed bump negative" offers some reassurance against a diagnosis of appendicitis, being "speed bump positive" certainly does not guarantee a diagnosis of appendicitis, so in this respect the myth is untrue. However, our findings suggest that questioning about speed bumps should form a routine part of the assessment of patients with possible appendicitis. Unanswered questions include whether the speed or manner of driving approach to a speed bump affects the diagnostic power

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