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Clinical assessment, radiographic imaging, and patient self-report for abdominal wall hernias

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ABSTRACT

Background: Increasingly, abdominal wall hernias are being diagnosed incidentally through radiographic imaging. Such hernias are referred to as occult. However, the clinical significance of occult hernias is unknown. The objective of this study is to determine the prevalence of occult hernias and to assess the abdominal wall quality of life (AW-QOL) among patients with occult hernias.

Materials and methods: A blinded, observational, cross-sectional study, October–December 2016, of patients presenting to single academic institution's general surgery clinics was performed. Inclusion criteria included all patients with a computed tomography scan of the abdomen or pelvis within the last year with no intervening abdominal or pelvic surgery. Patients were administered a validated AW-QOL survey and underwent a standardized clinical examination. Computed tomography scans were reviewed. Primary outcomes were prevalence and AW-QOL measured by the modified Activities Assessment Scale. AW-QOL of patients with no hernias was compared to that of those with occult hernias and clinically apparent hernias using Mann–Whitney U test.

Results: A total of 250 patients were enrolled of whom 97 (38.8%) had a hernia noted on clinical examination and 132 (52.8%) had a hernia noted on radiographic imaging. The prevalence of occult hernias was 38 (15.2%). Patients with no hernia had a median (interquartile range) AW-QOL of 82.5 (55.0–95.3), patients with clinically apparent hernias had AW-QOL of 47.7 (31.2–81.6; $P < 0.001$), and patients with occult hernias had AW-QOL of 72.4 (38.5–97.2; $P = 0.36$).

Conclusions: Both clinically apparent and occult hernias are prevalent. However, only patients with clinically apparent hernias had differences in AW-QOL when compared to patients with no hernias. Prospective trials are needed to assess the outcomes of patients with occult hernias managed with and without surgical repair.

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Introduction

Hernia repair is one among the most common procedures performed by surgeons. Indications for elective repair include pain, functional limitations, or cosmetic concerns.^{1,2} In the past, hernias were largely diagnosed through patient self-report and/or clinical assessment. However, in the current era, hernias are increasingly being diagnosed through radiographic imaging. Little is known about hernias identified only on radiographic imaging, otherwise referred to as occult hernias.^{3,4} There is a paucity of evidence to guide clinicians on management strategy when patient self-report, clinical assessment, and radiographic imaging do not correlate.

The aim of this study is to assess differences in abdominal wall quality of life (AW-QOL) among patients based on clinical assessment, radiographic imaging, and patient self-report of hernias. We hypothesize that¹ the prevalence of occult hernias of a population seen in surgery clinic is high (>30% of overall population),² patients with occult hernias do not have clinically significant differences in AW-QOL compared to patients without a hernia, and³ patients with clinically apparent hernias have a diminished AW-QOL compared to patients without a hernia.

Materials and methods

After approval by the institutional review board, a prospective, observational, cross-sectional study was performed. Strengthening The Reporting of Observational Studies in Epidemiology guidelines were followed.⁵ All adult patients over the age of 18 y presenting to a single-institution's surgery clinics, including breast, colorectal, general surgery, hernia, and surgical oncology, from October to December 2016 were eligible for enrollment. Inclusion criteria included all patients with a computed tomography (CT) scan of abdomen or pelvis within the last year with no intervening abdominal or pelvic surgery. CT scans were performed for varying reasons, including assessment for ventral or inguinal hernias, annual surveillance after oncologic resection, and staging purposes, among others. The studies were ordered by different departments and were of varying phases and slice thicknesses. Patients unable to sign consent forms due to language (only Spanish or English consents) and prisoner status were excluded.

Patients were administered a survey that included questions concerning their awareness of any abdominal wall hernia along with the modified Activities Assessment Scale (AAS), a validated survey of AW-QOL.⁶⁻⁸ The AAS is a widely utilized and validated 13-question abdominal wall-specific QOL survey previously developed and validated in 2164 patients before and after hernia repair surgery. The questionnaire investigates patients' psychosocial QOL and abdominal wall function through questions covering mood, lifestyle, and physical activity.⁹⁻¹¹ Similar alternative versions of this survey have been developed, most recently with the modified AAS^{8,12} which is endorsed and utilized by the Americas Hernia Society¹³ and the Ventral Hernia Outcomes Collaborative. The

minimally clinically important difference (MCID) of this survey is 7 for slight differences and 14 for definite differences.^{7,14}

After the survey, a clinician blinded to the survey results and CT scans performed a standardized clinical examination on all patients. Three trained individuals performed these standardized physical examinations on all patients to eliminate the confounding variable of variation in physical examination. Patients were examined in standing and supine positions as well as with and without Valsalva for ventral and groin hernias. A reviewer blinded to the surveys and clinical examinations reviewed all CT scans for ventral and groin hernias based on the previously reported criteria.¹⁵ The clinicians performing the physical examination for possible hernias were separate from those individuals administering clinical care. The investigator clinicians' assessments did not impact clinical decision-making in any way.

Patients were classified into four groups based on clinical and radiographic findings: clinically apparent hernia (hernia noted on examination and CT), occult hernia (hernia noted on CT but not on physical examination), possible hernia (hernia noted on examination but not on CT), and no hernia (hernia not noted on examination or CT). Each group was further assessed by the proportion of patients who self-reported that they had a hernia. The primary outcome for each of the hypotheses was¹ prevalence of occult hernias and^{2,3} AW-QOL as measured by the modified AAS among patients in the four study groups (Table 1). Secondary outcomes included differences in AW-QOL among the four subgroups stratified by patient self-assessment as well as abdominal defect width. Width was defined as the greatest lateral distance between fascial edges on transverse cuts.

The study was powered with an alpha of 0.05 and a beta of 0.90 to determine whether AW-QOL is equivalent between occult and clinically apparent hernias. Based on our previous work, the baseline score of patients without a hernia was assumed to be 80 with a standard deviation of 14. The margin was set at six so as to exclude differences in AW-QOL that were not considered clinically relevant (based on MCID). Based on an estimated ratio of 2:1 (no hernia:occult hernias), a total of 30 patients with an occult hernia and 60 patients with a clinically apparent hernia were needed to demonstrate equivalence between occult hernias and clinically apparent hernias. To achieve this sample size, we estimated that we need to assess at least 200 patients (estimated prevalence of

Table 1 – Prevalence of the study groups.

Overall N = 250	Clinical hernia	
	Yes (n = 97)	No (n = 153)
Radiographic hernia		
Yes (n = 132)	Clinically apparent hernia, 94 (37.6%)	Occult hernia, 38 (15.2%)
No (n = 118)	Possible hernia, 3 (1.2%)	No hernia, 115 (46.0%)

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