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Ultrasound findings of incidental adnexal and ovarian lesions on emergency CT scans ☆

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ABSTRACT

A search through 6076 nontraumatic emergency computed tomography (CT) scans of female patients yielded 266 (4.4%) CT scans with an incidentally detected adnexal lesion and ultrasound follow-up within 7 days. The population was 87% premenopausal and 13% postmenopausal. Follow-up ultrasound yielded an ultrasound diagnosis 32% of the time. Potentially serious diagnoses included pelvic infection (3%) and suspected malignancy (2%). Benign diagnoses included normal ovaries (16%), hemorrhagic cyst (6%), and benign cyst (5%). The remaining 68% of cases were equivocal, requiring further evaluation.

1. Introduction

Approximately 4–5% of computed tomography (CT) scans of female patients result in an incidentally noted adnexal lesion [1–3]. The decision to further work up these lesions is balanced between imaging costs and the small chance that one of these lesions may represent significant pathology such as malignancy or infection. Various strategies have been outlined for management of these adnexal lesions [4,5], including a white paper published by the ACR Incidental Findings Committee II on Adnexal Findings [6].

Prior studies have examined incidental adnexal lesions in an oncology-rich population [1] and postmenopausal patients undergoing CT colonography screening [2,3]. This study attempts to quantify the diagnostic yield of follow-up ultrasounds for an incidentally detected adnexal lesion seen initially on CT in the emergency setting.

2. Materials and methods

2.1. Study design

This study is a retrospective chart review. Institutional review board approval was obtained and informed consent was waived.

2.2. Patient population

Women undergoing emergency room CT scans that included their pelvis between January 1, 2007 and December 31, 2010 were included in the study. Scans were performed at a tertiary care hospital in an urban setting and several affiliated community hospitals. None of these facilities was a trauma center. The majority of the CT scans were performed for abdominal pain and flank pain. A combination of radiology residents, community radiologists, and fellowship-trained abdominal imaging attendings interpreted the emergency CT scans and follow-up ultrasounds.

2.3. Study procedures

Both preliminary CT reports by the on-call radiology resident (if applicable) and final CT reports by the attending radiologist were examined for follow-up ultrasound recommendations. Inclusion criteria included (1) an ultrasound recommendation for adnexal pathology in the CT report and (2) a follow-up ultrasound completed ≤7 days from the initial CT scan. Pelvic ultrasounds that were performed for strictly nonadnexal pathology (e.g., fibroids or endometrial fluid) were excluded. CT scans performed for pelvic symptoms were also excluded.

Because not all ultrasound recommendations carry the same weight, the recommendations were subdivided into ultrasounds strongly recommended by the radiologist and ultrasounds left as an option for the referring clinician. A strong recommendation utilized the word "recommend" without further qualification. An optional recommendation was indicated by terms such as "ultrasound could be obtained" or "if clinically indicated" within the report.

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An age cutoff of 50 years was used to divide premenopausal and postmenopausal populations, similar to prior studies [1–3].

2.4. Ultrasound lesion management

The ultrasound report findings were classified by the authors into the following management categories: potentially serious, benign, or equivocal. *Potentially serious* findings included pyosalpinx, pelvic inflammatory disease (PID), tuboovarian abscess, thrombophlebitis, and ovarian neoplasm. *Benign* findings included normal ovaries, cyst not requiring follow-up, and hemorrhagic cyst not requiring follow-up. *Equivocal* reports expressed a degree of diagnostic uncertainty that could not be classified into benign or potentially serious. These included cysts requiring follow-up, hemorrhagic cysts requiring follow-up, indeterminate findings, or reports listing several possible diagnoses.

2.5. Statistical analysis

Continuous variables were compared using Student's *t* test. Categorical variables were compared using the X^2 test.

3. Results

3.1. Demographics

A total of 6076 CT scans during the study period were screened for inclusion (3162 premenopausal and 2914 postmenopausal). A total of 274 of these patients underwent further ultrasound examination (240 premenopausal and 34 postmenopausal) for adnexal findings within 7 days (92% were performed within 3 days or less, with an average of 0.8 days). The vast majority of CT scans were performed for abdominal pain (78%) and flank pain (8%). Pelvic pain was the indication in only 8 (3%) of the cases (Table 1), and these were excluded from analysis. The remaining 266 CT ultrasound pairs (4.4%) represented the sample of incidentally detected adnexal lesions. The age of this population was 35±15 years (average±standard deviation). The median age was 31 years with an age range of 18–94 years. Patients receiving strong ultrasound recommendations were slightly older than those receiving optional ultrasound recommendations (Table 2).

3.2. Ultrasound lesion management classification

The classification of the adnexal lesions by management category, menopausal status, and degree of recommendation is provided in Table 3. On ultrasound, 27% were declared benign and 5% were deemed potentially serious. The remaining 68% of the incidentally noted adnexal lesions fell into the equivocal category, requiring additional follow-up and management.

Table 1
Classification of ultrasound category by CT indication

Indication	Total	Potentially serious	Equivocal	Benign
Abdominal pain	213	10	146	57
Flank Pain/stone	22	0	15	7
Other[a]	17	3	12	2
Pelvic pain[b]	8	0	6	2
History not available	14	0	8	6
Total	274	13	187	74

[a] Includes pain not otherwise specified, ascites, vomiting, fall, and weight loss.
[b] Excluded from analysis.

Table 2
Sample population demographics

	Strong US recommendation	US optional	*P* value
n	146	120	
Age	37±16	33±13	.02
Premenopausal	125 (86%)	107 (89%)	.39
Postmenopausal	21 (14%)	13 (11%)	

3.3. Potentially serious lesions

Potentially serious diagnoses included pelvic infection (3%) and suspected malignancy (2%). The lesions classified as potentially serious are enumerated in Table 4. An infectious etiology was the most common potentially serious finding in patients younger than 50 years. Suspected neoplasms were the cause of concern in older women.

3.4. Infection and inflammation

Potentially serious cases with a strong ultrasound recommendation resulted in ultrasound diagnoses of pyosalpinx and PID. Three of four of these cases were suspected on the CT examination prior to the ultrasound, although the wording was less specific. One of the cases of PID was not mentioned in the CT report.

Those follow-up ultrasounds left to the referring clinicians' discretion resulted in ultrasound diagnoses of pyosalpinx, PID, thrombophlebitis, and tuboovarian abscess. Within this subgroup, the tuboovarian abscess was already suspected on CT. In the remaining three cases, the final ultrasound diagnosis was not mentioned in the CT report, although the reports did mention an undetermined lesion within the adnexa.

3.5. Suspected neoplasms

There were a total of 5 suspected neoplasms detected and were all in women age 48 years and older. Further review of the 5 patients with suspected neoplasm revealed that 3 patients (ages 51, 65, and 67 years) underwent surgery soon after diagnosis, resulting in 2 serous adenocarcinomas (Fig. 1) and 1 benign serous cystadenofibroma (Fig. 2). Each of these lesions tended to be large, complex, and readily visible by CT alone. One of the 5 patients (age 48 years) was lost to follow-up. The remaining patient (age 86 years) had an ultrasound recommended for evaluation of a *left* adnexal soft tissue density and uterine fibroids. The ultrasound detected a *right-sided* (contralateral) mass suspicious for a neoplasm. The patient underwent biopsy, which showed smooth muscle proliferation suggestive of leiomyoma. Her CA-125 values were within the normal range, and she was still living 3 years after her initial CT scan, suggesting no malignancy.

3.6. Benign adnexal lesions

The lesions classified as benign are listed in Table 5. Benign diagnoses included normal ovaries (16%), hemorrhagic cyst (6%), and benign cyst (5%).

Table 3
Adnexal lesions by management classification, menopausal status, and strength of ultrasound recommendation

		Potentially serious	Benign	Equivocal	Total
Age	Total premenopausal	9 (4%)	66 (28%)	157 (68%)	232
<50 years	US strongly recommended	5	21	99	125
	US optional	4	45	58	107
Age	Total postmenopausal	4 (11%)	6 (18%)	24 (71%)	34
>50 years	US strongly recommended	4	2	15	21
	US optional	0	4	9	13
Total		13 (5%)	72 (27%)	181 (68%)	266