Published in final edited form as:
J Emerg Med. 2010 September ; 39(3): 275–281. doi:10.1016/j.jemermed.2007.11.060.

Does Gender Influence ED Management and Outcomes in Geriatric Abdominal Pain?

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Abstract

Background—Prior studies have suggested gender-based differences in the care of elderly patients with acute medical conditions such as myocardial infarction and stroke, but it is unknown whether these differences are seen in the care of abdominal pain.

Study Objectives—To examine differences in evaluation, management, and diagnoses between elderly men and women presenting to the emergency department with abdominal pain.

Methods—Observational cohort study; chart review of consecutive patients 70 years or age or older presenting with a chief complaint of abdominal pain. Primary outcomes were care processes (e.g. receipt of pain medications, imaging) and clinical outcomes (e.g. hospitalization, etiology of pain, and mortality).

Results—Of 131 patients evaluated, 60% were women. Groups were similar in age, ethnicity, insurance status, and predicted mortality. Men and women did not differ in the frequency of medical (56% vs. 57%), surgical (25% vs. 18%), or non-specific abdominal pain (19% vs. 25%, p=0.52) diagnoses. Similar proportions underwent abdominal imaging (62% vs. 68%, p=0.42), received antibiotics (29% vs. 30%, p=0.85), and opiates for pain (35% vs. 41%, p=0.50). Men had a higher rate of death within three months of the visit (19% vs. 1%, p<0.001).

Conclusion—Unlike prior research in younger patients with abdominal pain and among elders with other acute conditions, we noted no difference in management and diagnoses between older men and women with who presented with abdominal pain. Despite a similar predicted mortality and ED evaluation, men had a higher rate of death within three months.

Keywords

Abdominal pain; Gender; Emergency department; Geriatrics; Elderly

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INTRODUCTION

7.6 million people a year visit emergency departments with abdominal pain, making it the most common reason for Emergency Department (ED) visits in the United States (1). Older patients with abdominal pain have a high likelihood of being admitted (2–4), often require surgical intervention (2,5), and have a high mortality rate (3,5). These associations may exist because elders manifest abdominal pathology atypically or because non-abdominal illnesses (e.g. myocardial infarction) may present as abdominal pain (2,4,6). As a result, guidelines caution against giving a diagnosis of nonspecific abdominal pain to older patients (7), and the evaluation of abdominal pain in elders is a time-consuming and expensive endeavor in the ED (8–10).

Although few studies have examined gender differences in the management and outcomes of elders with abdominal pain specifically, gender-based comparisons have been described in the care of elders with other acute medical conditions. Older men with chest pain or acute myocardial infarction may receive angiography and reperfusion more often than women (11–13), and men are more likely to get aspirin after acute coronary syndromes (13–15). Older women hospitalized for stroke are less likely to undergo brain imaging, doppler examination, echocardiogram, and angiography, as well as carotid surgery (16,17). They are also less likely to receive aspirin, ticlopidine, angiotensin converting enzyme inhibitors, and statins after a cerebrovascular event (18,19).

Despite the prevalence of the problem, there are few data to describe whether age and gender influence the management, workup, and eventual diagnosis in older patients presenting to the ED with abdominal pain. In particular, there are few data to describe whether gender influences the likelihood of an elder receiving pain medication, undergoing imaging, or leaving the ED with a diagnosis of non-specific abdominal pain. We undertook a retrospective analysis of emergency department visits to examine our hypothesis that gender would play an important role in abdominal pain evaluation and outcomes in elderly patients.

MATERIALS AND METHODS

Study Setting

The study site was the emergency department (ED) at the University of California, San Francisco (UCSF), an academic medical center providing quaternary care for a predominantly urban population. The UCSF ED has 40,000 patient visits per year.

At UCSF, adult patients with abdominal pain are initially evaluated by the ED service, composed of emergency medicine and internal medicine residents supervised by an attending physician board certified in emergency medicine. Further evaluation by surgical residents is at the discretion of the ED or the admitting services. There are no specific guidelines for managing abdominal pain and no systematic differences in how older patients receive care (i.e., no geriatrics unit, no standard criteria for surgical consultation) in the ED or hospital.

Our research was approved by the institutional review board of the University of California, San Francisco Medical Center.

Selection of Participants

Patients were included in the study if they had been seen in the UCSF ED between June 1, 2004 and August 31, 2004, were aged 70 or more, and had a chief complaint of abdominal

pain. After reviewing every chart from the study period, we identified 131 consecutive subjects who reported abdominal pain as their chief complaint to either the triage nurse or the initial treating physician. This sample size was chosen in order to provide 80% power to detect a 25% absolute difference in discharge diagnosis frequency between men and women. While this might seem a large effect size, it is consistent with other studies of disparities(20–22). We chose 70 as our age cutoff to be consistent with other studies examining a geriatric population (23–26).

Data Collection

Data were abstracted from ED physician documentation, nursing notes, and medication records. If a patient was admitted, electronic and paper hospital records were reviewed to obtain information on further laboratory and radiographic studies, operative interventions, and final discharge diagnoses. Death dates for patients were obtained from the Social Security Death Index (27).

One reviewer (RG) abstracted charts and the electronic records using a data collection tool developed specifically for the study; the abstractor was not blinded to study objectives. Our chart abstraction process collected patient demographics, patient clinical characteristics (such as duration of abdominal pain, comorbidities, recent surgery), elements of the ED evaluation and management (such as use of imaging and pain medications), ED diagnosis, and hospital discharge diagnosis.

Discharge diagnoses were grouped a priori into three categories: medical causes of abdominal pain (e.g., urinary tract infection, myocardial infarction), surgical causes of abdominal pain (e.g., cholecystitis, small bowel obstruction), and nonspecific abdominal pain. The final discharge diagnosis was defined as the ED diagnosis if the patient was discharged home from the emergency department and was defined as the hospital discharge diagnosis if the patient was admitted to the hospital. For a nonspecific abdominal pain diagnosis, we included “nonspecific abdominal pain,” “undifferentiated abdominal pain,” “abdominal pain of unknown etiology,” or “abdominal pain not otherwise specified.” Two of the authors (RG and AA) independently determined the diagnosis category for each patient, and then resolved disagreements by consensus.

Statistical Analysis

A two-sided p-value of ≤ 0.05 was considered statistically significant. Chi-square tests and Wilcoxon rank sum tests were employed to test for differences in demographic characteristics, ED management, and hospital course and follow-up. We performed a sensitivity analysis excluding patients with a pain duration of more than seven days. A log rank test was used to compare survival curves. All analyses were performed using SAS statistical software (9^{th} version; Cary, NC).

RESULTS

Baseline Characteristics (Table 1)

131 consecutive patients 70 years and older with abdominal pain were evaluated in the ED during the study period. Fifty-two (40%) were men and 79 (60%) were women; mean age was 81 years for men and 80 for women ($p = 0.94$). Other characteristics were similar in both groups, including ethnicity, primary language, insurance status, and baseline comorbidity.

ED Management (Table 2)

Men and women were managed similarly in the ED. Both groups waited about 20 minutes to see a doctor, and those who were discharged home had a median ED length of stay of 280 minutes for men and 319 minutes for women (p = 0.47). Very few patients of either gender received a pelvic or genital examination: 13% of men and 4% of women. Diagnostic test ordering was similar in both groups, including electrocardiograms, laboratory tests, and imaging studies. About half of the patients, equally divided between men and women, had an abdominal CT scan. Rates of opioid analgesia, antibiotics, and surgical service consultation were also similar.

Hospital Course (Table 3)

A majority of patients in both groups was admitted—60% of men and 70% of women (p = 0.20). Among the admitted patients, most were admitted to non-surgical services. Five (16%) of the men and 11 (20%) of the women required an operation during the hospitalization (p=0.46). Ten men (19%) died within three months of the ED visit; one woman died (p<0.001) (Figure).

Diagnoses

Among patients who were admitted, the ED diagnosis correlated with the hospital discharge diagnosis in 52% of the men and 69% of the women (p=0.11). There were no differences between elderly men and women in the frequency with which they were assigned a final diagnosis of medical, surgical, or nonspecific abdominal pain (p=0.52 for heterogeneity among the three groups) (Table 4). These results were not significantly changed when subjects with a pain duration of greater than seven days were excluded from the analysis (data not shown). The most common diagnoses for men included biliary disease, nonspecific abdominal pain, urinary retention, and constipation. For women, nonspecific abdominal pain, biliary disease, urinary tract infection, and small bowel obstruction were most commonly diagnosed.

DISCUSSION

At our site, older men and women with acute abdominal pain were managed similarly in the ED and afterwards, suggesting that gender-based differences seen in the evaluation of other acute illnesses may not extend to abdominal pain. We also found that elderly men with abdominal pain appeared to have a substantially higher mortality in the 3 months after ED evaluation. However, whether this mortality difference represents differences in follow-up or hospital care or underlying comorbidity is unclear.

Several theories have been promulgated to explain why men and women are managed differently when presenting with similar conditions. For elective procedures, divergence in patients' priorities and in their perceptions about their disease and the efficacy of intervention may drive differences in treatment rates (28,29). For patients presenting with acute conditions, such as myocardial infarction or stroke, we would expect patient preferences to play less of a role. Anatomic or physiologic distinctions between men and women have been implicated (30,31), as well as systemic differences in physician decision-making (13,32). The role of physician bias has been contested, however, by those who have found little evidence for gender-based differences in management after multivariate adjustment (33–35).

While some studies have observed gender-based differences in care or outcomes among elders, others, like ours, have demonstrated comparable management of acute medical conditions. A study looking at the influence of gender on management and outcomes of

mechanically ventilated patients in a medical intensive care unit found no difference in the evaluation, treatment, or mortality between men and women over 65 years old (36). Similarly, older men and women admitted to the hospital with bleeding peptic ulcers had had similar rates of surgery and hospital length of stay and no difference in mortality (34). In an older cohort of patients presenting to the ED with a chronic obstructive pulmonary disease exacerbation, men and women had similar ED care and hospital admission rates (37).

Among younger men and women, there are marked gender differences in the etiology and evaluation of abdominal pain. Gynecologic pathology accounts for a significant portion of abdominal pain in women in this age group (38,39). About 25% of ED visits for abdominal pain result in a diagnosis of nonspecific abdominal pain (2,39), and young women outnumber men three to one with this diagnosis (39–41), even after taking gynecologic diagnoses into account.

Because of the prevalence of gynecologic pathology in younger women, guidelines for the evaluation of abdominal pain recommend a pelvic exam in nearly all women who present to the ED with acute abdominal symptoms (7,39,41–43). In this study, however, only a small number of women received a pelvic examination. It is not clear why so few patients underwent the recommended evaluation, and this may represent a potential area for quality improvement. The ED and discharge diagnoses did not include any gynecological etiologies for the patients' abdominal pain. Although it is possible that diagnoses designated as "nonspecific" really were gynecologic in origin, further studies are needed to determine if current guidelines could be revised to reflect the likely lower yield of this physical exam component in elderly female patients.

Guidelines for abdominal pain evaluation also often recommend digital rectal exams, while acknowledging that rectal exams may have limited diagnostic utility, particularly for appendicitis (44,45). Despite the guidelines' ambivalence about the value of the digital rectal exam, they do advocate testing stool for occult blood in all patients with abdominal pain (7,39,41). The rate of rectal exams and fecal occult blood testing in this study was about 50% in both men and women. It is not clear why this recommended evaluation was not performed in more patients, but the clinical practice may reflect the evidence showing low sensitivity and specificity for diagnosing acute abdominal pathology. Further research into the yield of fecal occult blood testing, in particular, in the emergency department evaluation of abdominal pain could help clarify the necessity of the rectal exam.

We are intrigued by our observation of higher mortality among men with abdominal pain. It remains possible that this finding is in part due to chance (and small death rates). It is also possible that we have been unable to adequately account for the influence of acute or chronic disease. Having said this, our mortality findings were present despite the fact that men and women in our cohort had similar predicted mortality according to their Charlson comorbidity scores, a valid measure of prognosis (46). If these findings are confirmed, guidelines for discharge instructions and follow-up care could be adjusted to reflect the greater risk for men presenting with abdominal pain.

This study had several limitations. We may have lacked the power to see small differences between elderly men and women in their evaluation, management, and diagnosis groupings. This seems less likely, however, given the similarity of the findings between men and women in chart-documented characteristics. Our study may have been subject to documentation biases, but it is unlikely that these biases would have disproportionately affected men or women. We did not blind the abstractor to the study hypotheses, nor did we check for interrater reliability. There may have been differences between the two genders in

the frequency of particular diagnoses, such as urinary tract infections, but the study was designed to look at overall diagnosis groups and not individual diseases. We do not have information on whether patients were admitted to a different hospital after being discharged. Lastly, the study was conducted at an academic medical center, and the findings in this patient population may not be generalizable to other settings. However, the admission rates, prevalence of nonspecific abdominal pain, and the need for surgical intervention in this study were similar to other published reports and suggest this cohort may be a representative cross-section of elderly abdominal pain patients.

Unlike previous research in younger patients with abdominal pain and among elders with other acute conditions, we found no difference in diagnoses and management between older men and women who presented to the emergency department with abdominal pain. We did observe a higher mortality rate among men within 3 months of their ED visit. Our study requires confirmation in larger settings; future investigation should address the role of the pelvic and rectal exams in elderly patients and identify which factors increase mortality in elderly men.

Acknowledgments

The authors wish to thank Dr. Otto Liebmann for his insightful review and comments on the manuscript.

Funding: Dr. Auerbach is supported by a K08 research and training grant (K08 HS11416-02) from the Agency for Healthcare Research and Quality, as well as an American Heart Association Grant-in-Aid (#0455008Y).

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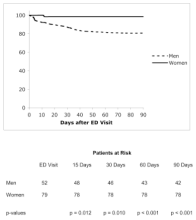

FIGURE. Survival Curves to 90 Days of Follow-up

Kaplan-Meier survival of patients, stratified by men (broken line) and women (solid line), seen in the Emergency Department (ED) with abdominal pain. The number of patients alive at the time of the ED visit, and at 15, 30, 60, and 90 days of follow-up, is displayed below the figure. P-values compare the survival curves of men and women at each time point, by the log-rank test.

TABLE 1

Baseline Characteristics of the Study Subjects*

Characteristics	Men (n = 52)	Women (n = 79)
Age, y		
70–79	24 (46%)	38 (49%)
80–89	22 (42%)	31 (39%)
> or = 90	6 (12%)	10 (12%)
Ethnicity		
White	25 (48%)	29 (37%)
Black	6 (12%)	10 (13%)
Asian	18 (35%)	27 (34%)
Other	3 (6%)	13 (16%)
Primary language English	31 (60%)	45 (57%)
Medicare	34 (81%)	60 (88%)
Symptom duration, days		
Median (range)†	1 (1, 120)	2 (1, 365)
Time of arrival in ED		
Day (07:00 – 18:59)	32 (62%)	47 (59%)
Night (19:00 – 06:59)	20 (38%)	32 (41%)
Comorbidities		
Asthma/COPD	6 (12%)	11 (14%)
Coronary artery disease	16 (31%)	26 (33%)
Cerebrovascular disease	8 (15%)	17 (22%)
Cancer – not metastatic	9 (17%)	13 (16%)
Cancer – metastatic	2 (4%)	1 (1%)
Past gastrointestinal bleeding	6 (12%)	4 (5%)
Chronic kidney disease	6 (12%)	6 (8%)
Charlson index(46)		
Median (range)†	1(0,10)	1(0,6)

ED = emergency department; COPD = chronic obstructive pulmonary disease.

*P > 0.05 for all comparisons, by Chi-squared analysis except as noted.

†P > 0.05 by Wilcoxon test of medians.

TABLE 2

Emergency Department Management*

Management	Men (n = 52)	Women (n=79)
Time to evaluation, min		
Median (range)†	20 (0–125)	24 (0–190)
Physical exam performed		
Abdominal	51 (98%)	78 (99%)
Rectal	27 (52%)	41 (52%)
Pelvic or genital	7 (13%)	3 (4%)
Skin	36 (69%)	57 (72%)
Pulses	17 (33%)	40 (51%)
Palpation for aorta	7 (13%)	4 (5%)
Serial exams	9 (17%)	8 (10%)
Laboratory tests		
Electrocardiogram	35 (67%)	62 (78%)
Urinalysis	42 (81%)	68 (86%)
Complete blood count	46 (88%)	74 (94%)
Basic metabolic panel	46 (88%)	74 (94%)
Liver function tests	42 (81%)	66 (84%)
Amylase or lipase	37 (71%)	62 (78%)
Oxygen saturation	51 (98%)	76 (96%)
Hemoccult	27 (52%)	41 (52%)
Rectal temperature	3 (6%)	5 (6%)
Troponin	20 (38%)	40 (51%)
Blood culture	13 (25%)	22 (28%)
Urine culture	16 (31%)	37 (47%)
Stool culture	1 (2%)	3 (4%)
Imaging		
Chest x-ray	31 (60%)	56 (71%)
KUB	14 (27%)	21 (27%)
Abdominal ultrasound	5 (10%)	19 (24%)
Abdominal CT scan	27 (52%)	38 (48%)
Opioid analgesia	18 (35%)	32 (41%)
Antibiotics	15 (29%)	24 (30%)
Surgical consult	13 (25%)	17 (22%)
Admission	31 (60%)	55 (70%)
Time in ED (if discharged), min		
Median (range)†	280 (81,760)	319 (65,1347)

Emergency Department Management*

Management	Men (n = 52)	Women (n=79)	Difference in percentages (95% CI)
Time to evaluation, min			
Median (range)†	20 (0−125)	24 (0−190)	4 (−8, 10)
Physical exam performed			
Abdominal	51 (98%)	78 (99%)	1 (−6, 10)
Rectal	27 (52%)	41 (52%)	0 (−18, 18)
Pelvic or genital	7 (13%)	3 (4%)	9 (−1, 23)
Skin	36 (69%)	57 (72%)	3 (−13, 20)
Pulses	17 (33%)	40 (51%)	18 (−5, 34)
Palpation for aorta	7 (13%)	4 (5%)	8 (−3,22)
Serial exams	9 (17%)	8 (10%)	7 (−6, 22)
Laboratory tests			
Electrocardiogram	35 (67%)	62 (78%)	11 (−5, 28)
Urinalysis	42 (81%)	68 (86%)	5 (−8, 20)
Complete blood count	46 (88%)	74 (94%)	6 (−6, 18)
Basic metabolic panel	46 (88%)	74 (94%)	6 (−6, 18)
Liver function tests	42 (81%)	66 (84%)	3 (−11, 18)
Amylase or lipase	37 (71%)	62 (78%)	7 (−8, 24)
Oxygen saturation	51 (98%)	76 (96%)	2 (−8, 10)
Hemoccult	27 (52%)	41 (52%)	0 (18, 18)
Rectal temperature	3 (6%)	5 (6%)	0 (−11, 10)
Troponin	20 (38%)	40 (51%)	13 (−6, 29)
Blood culture	13 (25%)	22 (28%)	3 (−14, 18)
Urine culture	16 (31%)	37 (47%)	16 (−2, 32)
Stool culture	1 (2%)	3 (4%)	2 (−8, 10)
Imaging			
Chest x-ray	31 (60%)	56 (71%)	11 (−6, 29)
KUB	14 (27%)	21 (27%)	0 (−16, 17)
Abdominal ultrasound	5 (10%)	19 (24%)	14 (0, 27)
Abdominal CT scan	27 (52%)	38 (48%)	4 (−14, 22)
Opioid analgesia	18 (35%)	32 (41%)	6 (−12, 23)
Antibiotics	15 (29%)	24 (30%)	1 (−16, 18)
Surgical consult	13 (25%)	17 (22%)	3 (−12, 20)
Admission	31 (60%)	55 (70%)	10 (−7, 27)
Time in ED (if discharged), min			
Median (range)†	280 (81,760)	319 (65,1347)	39 (−101, 215)

KUB = kidney, ureter, and bladder; CT = computed tomography; ED = emergency department.

*P > 0.05 for all comparisons, by Chi-squared analysis except as noted.

†P > 0.05 by Wilcoxon test of medians.

CI = confidence interval; KUB = kidney, ureter, and bladder; CT = computed tomography; ED = emergency department.

[*] $P > 0.05$ for all comparisons, by Chi-squared analysis except as noted.

[†] $P > 0.05$ by Wilcoxon test of medians.

TABLE 3

Hospital Course and Follow-Up*

Course	Men (n=31)	Women (n=55)
Admitting service		
Medicine	23 (74%)	33 (60%)
Surgery	4 (13%)	12 (22%)
Cardiology	3 (10%)	9 (16%)
Other	1 (3%)	1 (2%)
Surgical procedure	5 (16%)	11 (20%)
Endoscopy†	2 (6%)	7 (1%)
Length of stay, days		
Median (range)‡	4 (1–20)	4 (2–47)
ED diagnosis correlated with hospital discharge diagnosis	16 (52%)	38 (69%)
Return to ED within 7 days of visit§	3(6%)	7(9%)
Death within 3 months of visit‖	10 (19%)	1(1%)

Hospital Course and Follow-Up*

Course	Men (n=31)	Women (n=55)	Difference in percentages (95% CI)
Admitting service			
Medicine	23 (74%)	33 (60%)	14 (−9, 34)
Surgery	4 (13%)	12 (22%)	9 (−11, 25)
Cardiology	3 (10%)	9 (16%)	6 (−12, 21)
Other	1 (3%)	1 (2%)	1 (−11, 14)
Surgical procedure	5 (16%)	11 (20%)	4 (−17, 21)
Endoscopy†	2 (6%)	7 (1%)	7 (−12, 20)
Length of stay, days			
Median (range)‡	4 (1–20)	4 (2–47)	0 (−1, 3)
ED diagnosis correlated with hospital discharge diagnosis	16 (52%)	38 (69%)	17 (−5, 39)
Return to ED within 7 days of visit§	3(6%)	7(9%)	3 (−9, 13)
Death within 3 months of visit‖	10 (19%)	1(1%)	18 (7, 32)

*P > 0.05 for all comparisons, by Chi-squared analysis except as noted.

†Either esophagogastroduodenoscopy, colonoscopy, or endoscopic retrograde cholangiopancreatography. If a subject had more than one procedure, he or she was only counted once.

‡P > 0.05 by Wilcoxon test of medians.

§Compares all of the subjects (52 men and 79 women), not just those hospitalized.

‖P < 0.0001 by Fisher's exact test, compares all of the subjects (52 men and 79 women), not just those hospitalized.

CI = confidence interval.

[*] P > 0.05 for all comparisons, by Chi-squared analysis except as noted.

[†] Either esophagogastroduodenoscopy, colonoscopy, or endoscopic retrograde cholangiopancreatography. If a subject had more than one procedure, he or she was only counted once.

[‡] P > 0.05 by Wilcoxon test of medians.

[§] Compares all of the subjects (52 men and 79 women), not just those hospitalized.

[‖] P < 0.0001 by Fisher's exact test, compares all of the subjects (52 men and 79 women), not just those hospitalized.

TABLE 4

Abdominal Pain Diagnosis Category*		
Diagnosis	**Men (n=52)**	**Women (n=79)**
Medical	29 (56%)	45 (57%)
Surgical	13 (25%)	14 (18%)
NSAP	10 (19%)	20 (25%)

Abdominal Pain Diagnosis Category*			
Diagnosis	**Men (n=52)**	**Women (n=79)**	**Difference in percentages (95% CI)**
Medical	29 (56%)	45 (57%)	1 (−17, 19)
Surgical	13 (25%)	14 (18%)	7 (−8, 23)
NSAP	10 (19%)	20 (25%)	6 (−10, 21)

NSAP = nonspecific abdominal pain.

* P > 0.05 for all comparisons, by Chi-squared analysis.

CI = confidence interval; NSAP = nonspecific abdominal pain.

* P > 0.05 for all comparisons, by Chi-squared analysis.