

ORIGINAL ARTICLE

Differential Diagnosis of Flank Pain in the Emergency Department

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ABSTRACT

Background: flank pain is a well-recognized and common complaint among attendants to the emergency department worldwide and demands careful evaluation and proper management to relief patient's discomfort**Objective:** the study was intended to determine the causes of flank pain for patients attending the emergency department**Patients and methods:** Through a period of seven months (450) patients with flank pain were enrolled in the study in the emergency department. Two hundreds of them were female and (250) were males, their ages ranged from (12-70) years with an average of (38± 8 SD). All of them underwent full evaluation, including detailed history, physical examination and the available investigations, then statistical analysis was done and the results were recorded.**Results:** The total number of patients in the sample of study was (450), males were (250) and females were (200), with a male to female ratio of (1.25:1). Most patients (nearly 61%) were in the age group (21-40)years. Patients with renal colic due to urolithiasis constituted more than (53%) with male predominance, male to female ratio was (1.7:1). Urinary tract infection made (8.4%) of the total cases of flank pain. Female predominate by (2.8:1), other cases are shown in the accompanying tables.**Conclusion:** the results showed that most patients with flank pain (61%) were young subjects (21-40) years old. Urolithiasis constituted more than (53%) of the causes of flank pain with a male Predominance by(1.7:1), while urinary tract infection made more than(8,4%) of the total number of causes, with female predominance (2,8:1). In about (5,6%) of cases no definite cause could be identified**Keywords:** flank pain, emergency department, urolithiasis, urinary tract infection, Miscellaneous

INTRODUCTION

The flank area is the area which extends from the lower ribs superiorly to the pelvis inferiorly and from the spine posteriorly to the upper abdomen anteriorly (Kahn A,2019). while the Loin area, is that area which covers the kidney i.e extends from the lower ribs above to the pelvis below (Loin pain, loin-Wikipedia).

Flank pain ranges in severity from mild distress or a dull ache to severe agony depending on the cause.

There are various classifications of the causes of flank pain reported in literature(Kahn A,2019; Goddard J et al,2010; Buschen A J,1990; 5) according to different authors. Most reports however mentioned that, There are three major causes of flank pain viz: Nephrolithiasis, pyelonephritis and musculo-skeletal pain (Luo EK and Villines Z,2019) Besides, there are less common and even rare causes but even though, these should be diagnosed properly. (Kumar R et al,2013; Keoghone SR et al,2009; Sharaf Eldin UAA et al,2017; Scott EM and Scott BB,1993, Wong L,2015; Yagoob MM and Ashman N,2021; Paryavi E,2010).

Diagnosis of the cause of flank pain depends on patients age, gender and co-morbid illness (Kahn A,2019) However detailed history taking, complete physical examination and suitable reliable investigations are the corner stone to arrive at definite diagnosis.

History taking should concentrate on the character of the pain, site, severity, duration, acute or chronic or recurrent, the referral of pain and associated symptoms (Buschen A J,1990) e.g severe stabbing pain of acute (sudden, onset) referred to the genital area and associated with pallor, sweating, vomiting, writhing, dysuria and hematuria is a strong suggestion that the diagnosis is a renal colic due to stone in kidney or ureter(5), although stones are sometimes asymptomatic or give atypical symptoms (Parmar MS,2004; Curhan GC et al,2021).

Urolithiasis is more common in males than females with racial variations (Stamatelou KK et al,2003; Tidy C and Gronow H,2016). Sustained dull ache in the Loin area, associated with fever, chills(rigor), dysuria, frequency and tender loin in a young woman are clue, to the diagnosis of pyelonephritis, which is more common in females than males due to physiological and anatomical differences from males.Flank pain occurring after a

heavy weight lifting or severe physical exercise usually points out to musculo-skeletal cause.

The association of acute flank pain with atrial fibrillation in an elderly patient with valvular heart disease raises the suspicion of renal infarction due to renal artery embolism, or a known patient with valvular heart disease, develops fever associated with flank pain in the left hypochondrial area should make the examiner thinking of subacute bacterial endocarditis. Investigations: are very helpful to reach a diagnosis of the cause of flank pain, these include simple tests such as general urine examinations, kidney functions tests, blood picture and radiography.

Plain radiography (KUB) of the abdomen may show a radiopaque urinary calculus which usually constitutes (70-90%) of renal stones, (Goddard J et al,2010). Sonography is very helpful to study the urinary and extra urinary organs, it is easy to interpret and available anywhere. Intravenous urography is still done in selected cases. Computerized tomography (C-T scan) is highly important diagnostic aid especially in unclear cases. e.g dissecting aortic abdominal aneurysm, renal infarction, renal vein thrombosis, acute appendicitis, acute cholecystitis, twisted ovarian cysts or even other rare conditions such as painful rib syndrome,(Kumar R et al,2013; Keoghone SR et al,2009) vit. D deficiency (Sharaf Eldin UAA et al,2017; Scott EM and Scott BB,1993), pelvi-ureteric junction obstruction,(Yagoob MM and Ashman N,2021). papillary necrosis, paravertebral-lumber compartment syndrome (Paryavi E,2010). Loin pain hematuria syndrome (Reifsteck JE et al,1987; Dube Gk et al,2006) and others.

PATIENTS AND METHODS

This study is a prospective cross- sectional one. It was carried out on patients complaining of flank pain, visiting the emergency department (E.D) of the Al-Hussain medical city teaching hospital in Karbala holly city, from first march to the end of august 2021.

Patients attending (E.D) were either refereed from urology or general surgery clinics or they visit it directly. The number of patients involved were (450), two hundred females and (250) males.

After taking detailed history and full physical examination, investigations were carried out including routine complete blood count (CBC), renal function test (B.urea and S. creatinine),

General urine examination(GUE) and radiography including plain abdomen(KUB), Sonography, sometimes intravenous urography and C-T scan. The results were recorded and statistically evaluated. Throughout the work, the guidelines of human rights were respected.

RESULTS

the number of patients studied were (450). Two hundred fifty were males and (200) females, with a ratio of (1.25:1) their ages ranged from (12-70) years, with an average of (38± 8 SD).

About (61%) of patients were young (21-40) years. Patients with renal colic due to stones constituted about (53%), with male predominance by (1.7:1), while females predominate in urinary tract infection by (1.7:1), while females predominate in urinary tract infection by (2.8:1). Some patient in spite of all available investigations no definite cause was identified. Full details are shown in tables from 1 – 7, with a histogram.

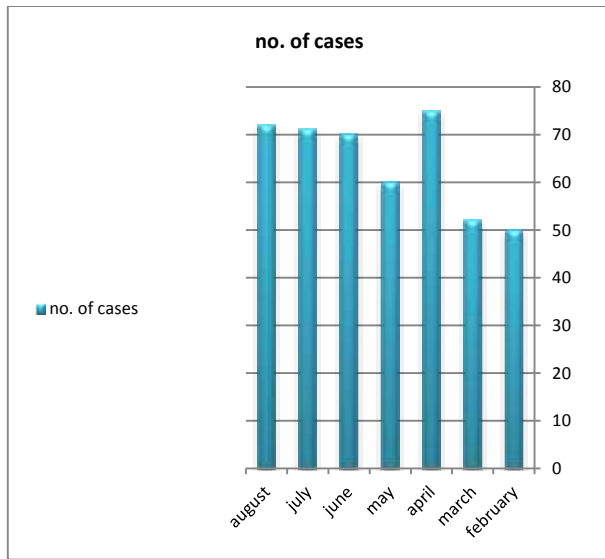


Fig. 1: Histogram Relation between the number of cases and the time of year.

Table 1: Common causes of flank pain encountered in the emergency department. N= 450

Diagnosis	Gender		Total no. of cases	Percentage of the total
	No. of males	No. of females		
Urolithiasis	150	90	240	53.33
Urinary tract infection	10	28	38	8.44
Musculo-skeletal	15	11	26	5.77
Unable to find cause	12	13	25	5.55
miscellaneous	63	58	121	26.88
Total	250	200	450	99.97

Table 2: Miscellaneous causes of flank pain n=121

Diagnosis	Gender		Total no. of cases
	male	Female	
Irritable bowel syndrome	10	16	26
Dehydration	13	3	16
Gall stone	6	9	15
Renal cysts	6	4	10
Cholecystitis	3	5	8
Hydronephrosis	4	3	7
Dyspepsia	2	3	5
Ulcerative colitis	1	4	5
Infective hepatitis	3	2	5
Acute appendicitis	3	2	5
Twisted ovarian	0	3	3
Intestinal obst.	2	1	3
Duodenal ulcer	2	1	3
Colonic cancer	2	1	3

Pleurisy and basal pneumonia	1	1	2
Renal tumor	2	0	2
Poly cystic kidney disease (PKD)	2	0	2
Shingles	1	0	1
Total	63	58	121

Table 3: Age and sex relations to the number of cases of flank pain n=450

Age group in years	Gender		Total number	Percentage of the total
	no. of males	no. of females		
12 – 20	19	16	35	7.77
21-30	75	68	143	31.77
31-40	74	58	132	29.33
41-50	42	33	75	16.66
51-60	20	15	35	7.77
61-70	20	10	30	6.66
Total no.	250	200	450	99.6

Table 4: Common causes of flank pain in U.K and Europe

causes
1- Renal stones
2-Acute pyelonephritis
3-Urinary tract obstruction:
1.Pelvi-ureteric obstruction.
2. ureteric stone
3.retroperitoneal fibrosis.
4.carcinoma of the bladder
5.Bengin prostatic hyperplasia
6. urethral stricture
7.Meatal stenosis

Table 5: Causes of flank pain (American classification)

More common causes	Less common causes
kidney infection	Kidney diseases
kidney abscess	Pancreatitis
kidney stone	Pneumonia
Dehydration	Appendicitis
Bladder infection	Urinary tract obstruction
Shingles	Inflammatory bowel disease
Tietze's syndrome	Renal infarction
Spinal arthritis	Abdominal aortic aneurysm
Disc disease	
Muscle spasm	

Table 6: Urinary causes of flank pain

Acute ureteral obstruction
Stone
Blood clot
Papillary necrosis
Chronic ureteral obstruction
Congenital anomaly of the pelvis
Tumor
Stricture of ureter
Previous surgery
Radiation therapy
Retroperitoneal fibrosis
Stone
Renal inflammation
Acute pyelonephritis
Perinephric abscess

Table 7: Differential diagnosis of flank pain

Infection:	Malignancy :
Cystitis	Uterine
Pyelonephritis	Adenxial
Urethritis	Ovarian
Renal :	Renal
Nephrolithiasis	Urinary Bladder
Cysts	Others e.g. musculo-skeletal trauma
Allergic interstitial nephritis	Adrenal mass
Ischemic papillary necrosis	
Renal malignancy	
Gastrointestinal :	
Constipation	
Gynecologic:	
Ectopic pregnancy	
Ovarian mass or adnexial mass	
Ovarian torsion	
Endometriosis	
Uterine tumor	
Pelvic inflammatory disease (salpingitis and cervicitis)	

DISCUSSION

In spite of differences among authors regarding the prevalence of the causes of flank pain, most of them have the same broadlines and similarities in the major causes including this study (tables 1 to 7),

Examples are: urolithiasis is the commonest cause of flank pain worldwide and it is also more common in males than females in all international studies especially in young people and rare in children and old age (Buschen A J,1990)while urinary tract infections dominate in females (Stamatelou KK et al, 2003; Tidy C and Gronow H,2016) and table (1).

The other causes of flank pain may differ in prevalence from country to another or study to another e.g in this study irritable bowel syndrome is a common cause of flank pain (table 2) especially in females. The disease is known to prevail among young Iraqi women and this number of patients is expected. The number of patients with dehydration in the study is high (table 2) again this is expected because the climate of Iraq is extremely hot and dry in summer months compared with other countries. The other factor is fasting during Ramadan for Muslims which enhances dehydration. (Fig1 the histogram)

In this country infective hepatitis is also prevalent and it is expected to see the number mentioned (table 2)

There are causes of flank pain rare in Europe and America but well recognized in other countries e.g. painful rib syndrome in India due to irritation of intercostal nerves by the adjacent hypermobile rib cartilage (Kumar R et al,2013; Keoghane SR et al,2009).

From Egypt there were reports that flank pain result from Vit D deficiency which cause osteomalacia of the lower rib (Sharaf Eldin UAA et al,2017) and hence causing pain and tenderness of these ribs (Sharaf Eldin UAA et al,2017). In China the prevalence of kidney stones varies from province to another, but more in rural areas (Wang W et al,2017), and people used to treat urinary stones by herbal medicine (Hisang-chun Lai et al,2018).

In Pakistan people also depend on medicinal plants for treatment of urinary stones (Nasim MJ et al, 2014).

There are reports from Europe and America talking about rare, but well-recognized causes of flank pain called idiopathic Loin pain hematuria syndrome which affect young people, of unknown cause with normal C-T scan (Zubair AS et al,2015).

Reports from Vietnam, Turkey and Africa (Malawi) mentioned about the occurrence of flank pain among patients with COVID-19 who had no symptoms of COVID-19, but discovered to have pleurisy and basal pneumonia revealed by C-T scan and by cross sectional abdominal C-T (Emrulla Durmus and Fesih OK,2021; Durmus E et al, 2020).

In south east Asia and especially Indonesia, medical reports talk about acute flank pain due to ingestion of Djenkol beans which may cause Djenkolism and leads to acute renal failure due to obstructive uropathy. (Bunawan NC et al,2014).

Recently the modern approach of diagnosis and management of acute flank pain by different imaging modalities and investigations, almost leaves no case without diagnosis of the cause of flank pain (Flam M et al,2001; Callagher H andTolley D A,2000; Heidenreich A et al,2002).

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