RESULTS

The present study was conducted on 71 selected male patients with different urinary bladder lesions. Their age ranged between 40 and 82 years {mean = 61.5 ± 18.32 years} (Table I, Figure 1). Clinical presentations of the 71 cases were recorded in (Table II, Figure 2).

All the patients were evaluated by transabdominal (TAUS) and transrectal ultrasound (TRUS) examination. Detection of bladder tumors by TAUS and TRUS according to their sites is recorded in comparison to the final accurate detection obtained by cystoscopy. TAUS was able to detect 31/44 (70.45%) while TRUS was able to detect 37/44(84.09%) of bladder tumors (Table III, Figure 3).

The sensitivity and positive predictive value of both TAUS and TRUS in detection of the site of tumor compared with cystoscopy (Table IV).

Detection of bladder tumors by TAUS and TRUS according to their sizes are recorded in comparison to the accurate size detected by CT (Table V, Figure 4).

Sensitivity and positive predictive value of both TAUS and TRUS in detection of the size of tumor compared with CT (Table VI).

The ultrasonographic staging results were compared to the pathological stages results obtained by histopathlogic examination of biopsies taken from bladder tumors during cystoscopy (Table VII).

The sensitivity, specificity and positive and negative predictive values of staging, over staging and under staging of bladder tumors by TAUS and TRUS (Table VIII). The accuracy of staging, over staging and under staging results was recorded in (Figure 5).

Concerning results of detection of bladder stones and bladder diverticula by TAUS and TRUS, results were recorded in (Table IX and X, Figure 6).

Table I: Distribution of patients according to their ages.

Age	frequency	
	No. of patients	Percent
40-50	7	(9.8%)
51-60	29	(40.84%)
61-70	32	(45.07%)
71-82	3	(4.22%)
Total	71	(100%)
Range	40-82	
Mean	61.5	
Standard deviation	18.32	

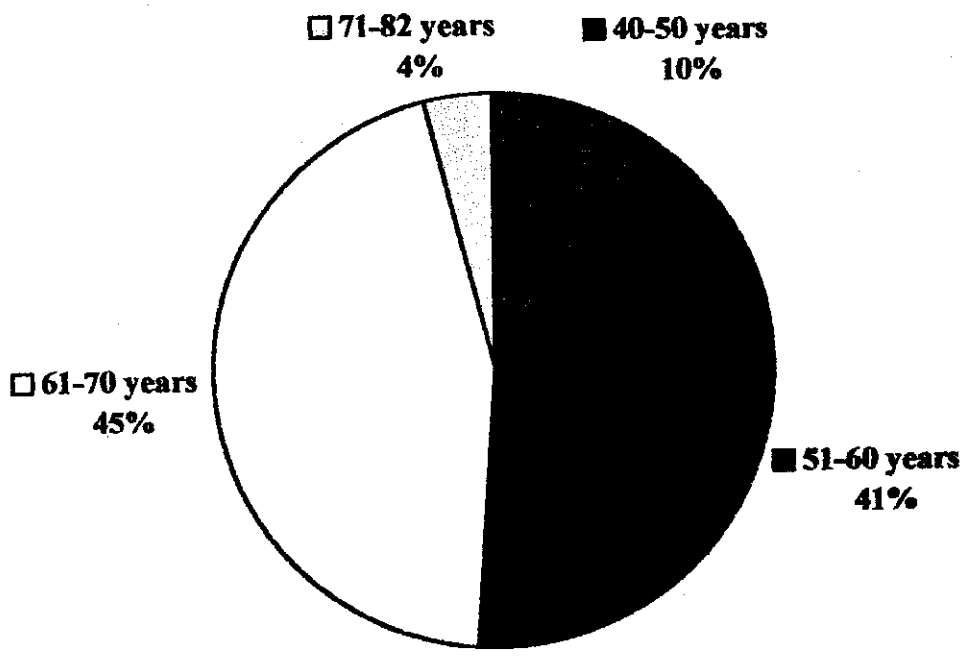


Fig. (1) Distribution of patients according to their ages.

Table II: Distribution of patients according to their clinical presentation.

Presentation	No. of patients	percent
Hematuria	30	(42.25%)
Irritative symptoms	15	(21.12%)
Recurrent UTI	10	(14.08%)
Obstructive symptoms	6	(8.45%)
Mixed complaints	10	(14.08%)
Total	71	(100%)

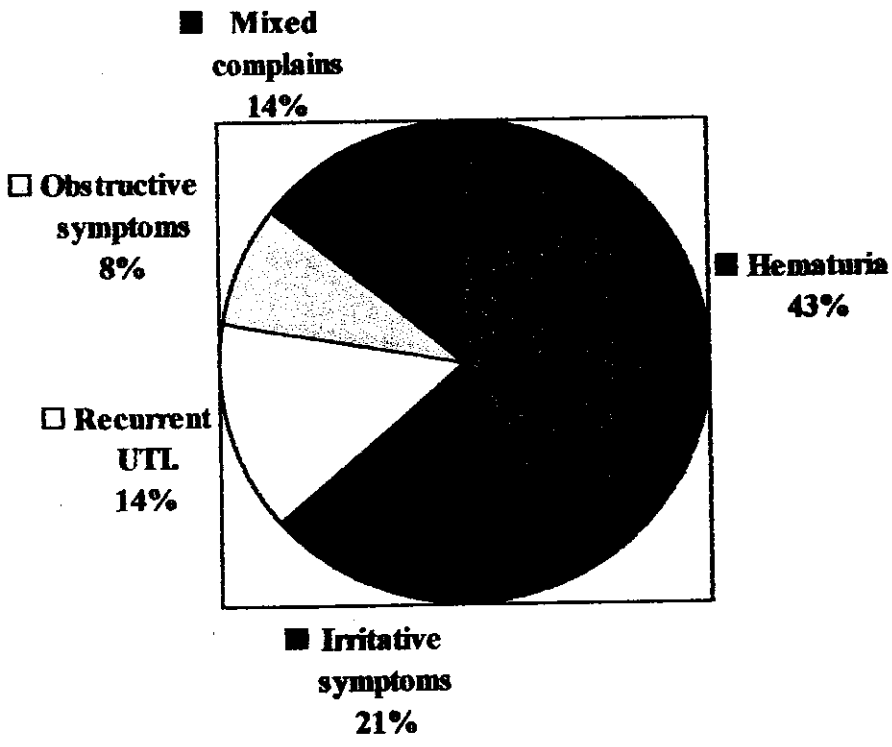


Fig. (2) Distribution of pateints according to their clinical presentation.

Table III: Results of detection of bladder tumors according to their sites by TAUS and TRUS in comparison to cystoscopy.

Tumor site	No. of cases	TAUS		TRUS	
		No.	Percent	No.	Percent
Dome	5	2	(40%)	2	(40%)
Lateral wall	19	18	(94.7%)	18	(94.7%)
Anterior wall	5	1	(20%)	4	(80%)
Posterior wall	10	8	(80%)	8	(80%)
Bladder neck	5	2	(40%)	5	(100%)
Total	44	31	(70.45%)	37	(84.09%)

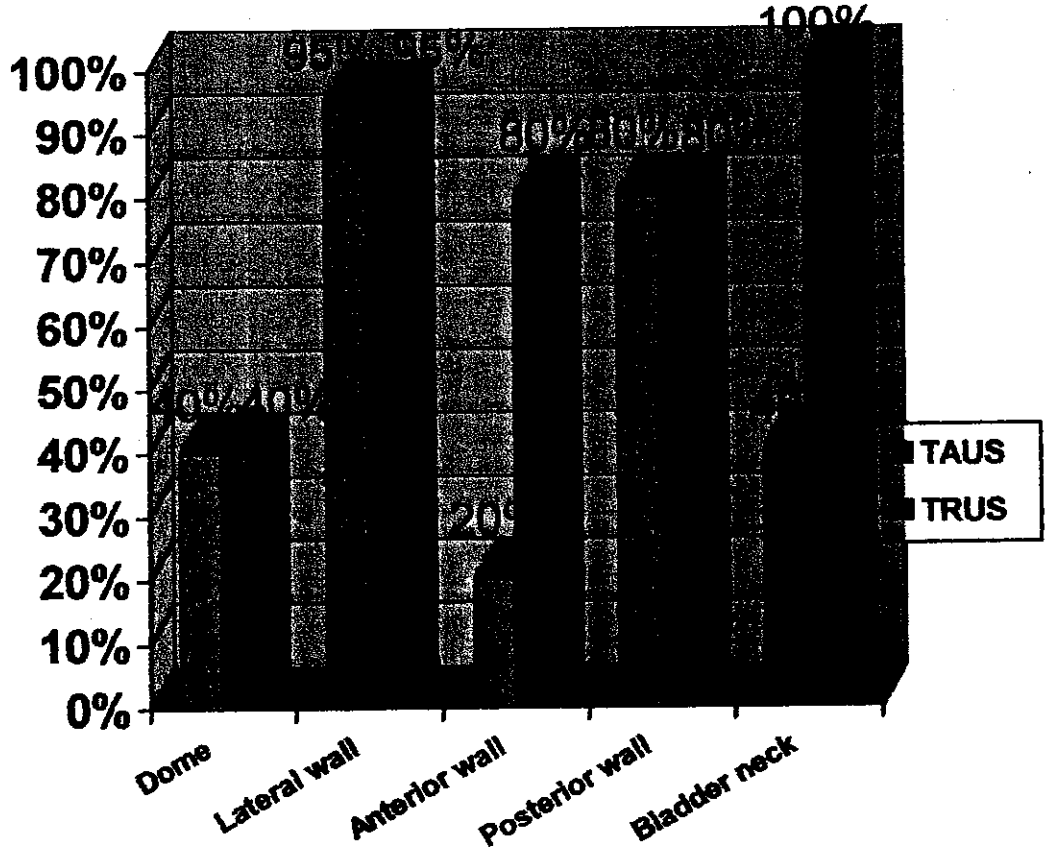


Fig. (3) Detection of bladder tumors according to their sites by TAUS and TRUS.

Table IV: sensitivity and positive predictive value of both TAUS and TRUS in detection of the site of tumor compared with cystoscopy.

cystoscopy	TAUS				TRUS			
	+ve		-ve		+ve		-ve	
	No.	%	No.	%	No.	%	No.	%
+ve	31	100	13	100	37	100	7	100
-ve	0	0	0	0	0	0	0	0
Total	31		13		37		7	
Sensitivity	100.0				100.0			
PPV	70.45				84.1			

Table V: Results of detection of bladder tumors according to their sizes by TAUS and TRUS.

Tumor size	No. of cases	TAUS		TRUS	
		No.	Percent	No.	Percent
0.5-1cm	10	3	(30%)	5	(50%)
1-2cm	18	13	(72.22%)	16	(88.88%)
>2cm	16	15	(93.75%)	16	(100%)
Total	44	31	(70.45%)	37	(84.09%)

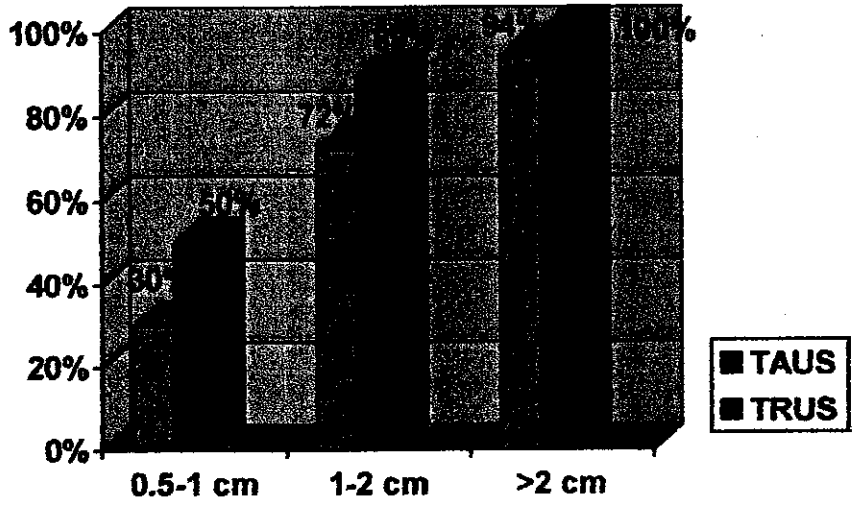


Fig.(4) Detection of bladder tumors according to their sizes.

Table VI: Sensitivity and positive predictive value of both TAUS and TRUS in detection of the size of tumor compared with CT.

CT	TAUS				TRUS			
	+ve		-ve		+ve		-ve	
	No.	%	No.	%	No.	%	No.	%
+ve	31	70.45	13	29.54	37	84.1	7	15.9
-ve	0	0	0	0	0	0	0	0
Total	31		13		37		7	
sensitivity	100.0				100.0			
PPV	70.45				84.1			

Table IX: Results of detection of urinary bladder stones by TAUS and TRUS in comparison to PUT.

PUT	TAUS				TRUS			
	+ve		-ve		+ve		-ve	
	No.	%	No.	%	No.	%	No.	%
Total	21	100	0	0	17	80.95	4	19.04
Sensitivity	100.0				100.0			
PPV	100				80.95			

Table X: Results of detection of urinary bladder diverticula by TAUS and TRUS in comparison to IVU.

IVU	TAUS				TRUS			
	+ve		-ve		+ve		-ve	
	No.	%	No.	%	No.	%	No.	%
Total	6	100	0	0	6	100	0	0
sensitivity	100.0				100.0			
PPV	100				100			

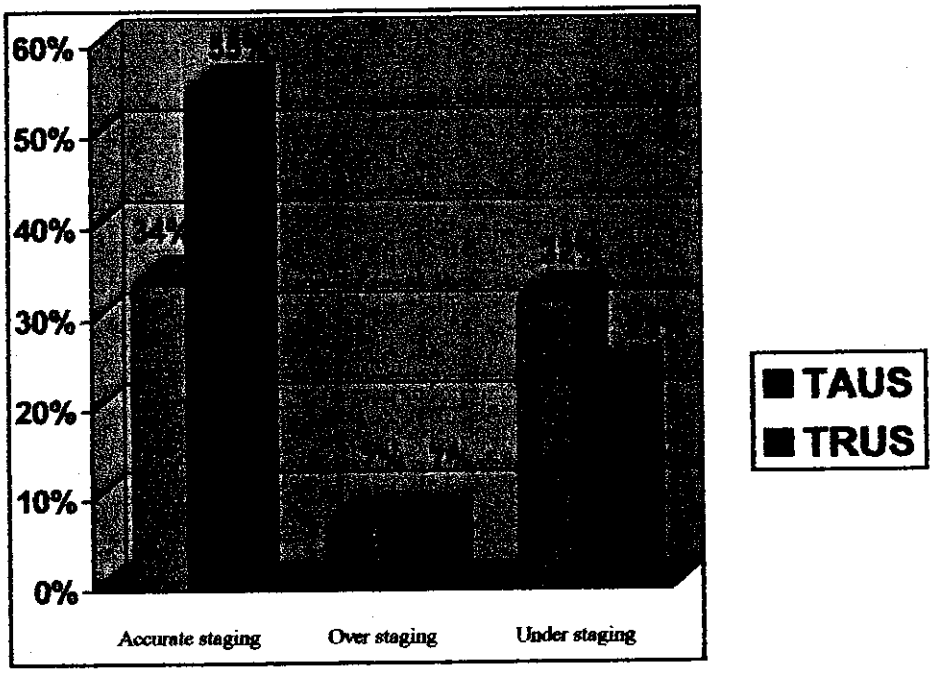


Fig.(5) Stagind, over staging and understaging of bladder tumors by TAUS and TRUS.

Table VII: Results of ultrasound staging(U) by TAUS and TRUS in comparison to pathological stages (P) by histopathology.

P	No.	TAUS					TRUS				
		U1	U2	U3a	U3b	U4	U1	U2	U3a	U3b	U4
P1	13	9	-	1	-	-	10	1	1	-	-
P2	7	2	2	-	-	-	3	2	-	-	-
P3a	9	2	1	2	1	-	2	2	2	1	-
P3b	9	-	2	3	1	-	-	1	2	4	1
P4	6	1	1	1	1	1	-	-	1	1	3

Table VIII: The sensitivity, specificity and positive and negative predictive values of staging, over staging and under staging of bladder tumors by TAUS and TRUS.

Staging accuracy	TAUS		TRUS	
	No.	Percent	No.	Percent
Accurate staging	15	(34.09%)	24	(54.54%)
Over staging	3	(6.81%)	3	(6.81%)
Under staging	14	(31.81%)	10	(22.72%)
Sensitivity	42		62.5	
Specificity	48.0		60.0	
PPV	39		49.5	
NPV	45.3		55.3	

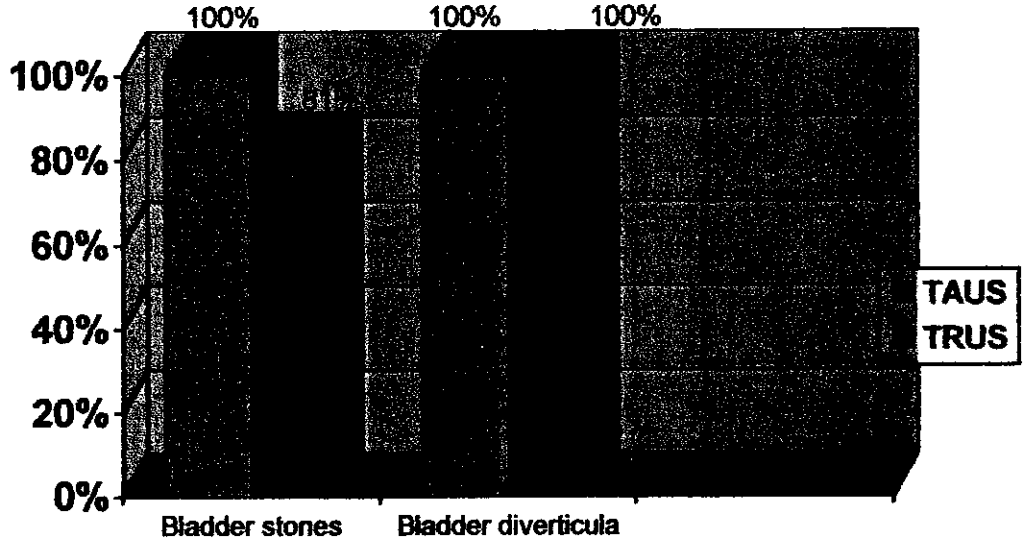


Fig.(6) Detection of bladder stones and diverticula by TAUS and TRUS.

Case presentation

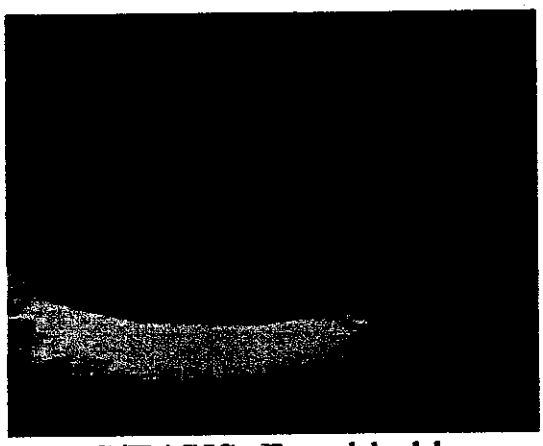
TS/TAUS: Lt. lat. wall bladder mass.

TS/TRUS : Lt. lat. wall bladder mass.

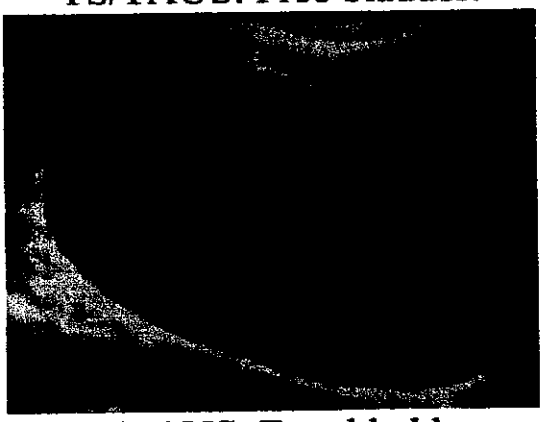
LS/TRUS: Lt. lat. wall bladder mass.

Case (1)

Case (1):
Clinical presentation: Hematuria.
PUT: free.
IVU: U.B. filling defect.
CT: bladder mass Lt. lateral wall.
Cystoscopy: bladder mass Lt. lateral wall.
TAUS : bladder mass Lt. lateral wall.
TRUS: bladder mass Lt. lateral wall.



TS/TAUS: Free bladder.

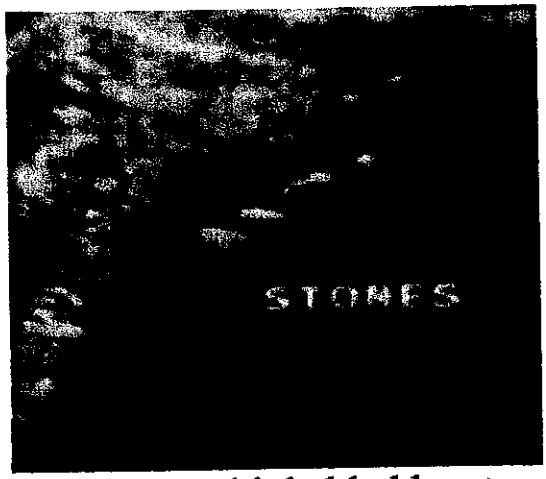


LS/TAUS: Free bladder.

LS/TRUS: Two small bladder masses at bladder neck.

Case(2)

Case (2):
Clinical presentation: Hematuria.
PUT: Free.
IVU: U.B. filling defect.
CT: Bladder mass.
Cystoscopy: Two small bladder masses at bladder neck.
TAUS: Free.
TRUS: Tow small bladder masses at bladder neck.



TS/TAUS: Multiple bladder stones.

TS/TRUS: Multiple bladder stones.

Case (3)

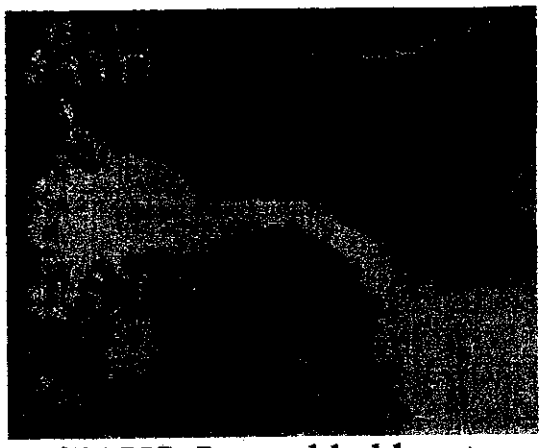
Case (3):

Clinical presentation: Irritative symptoms.

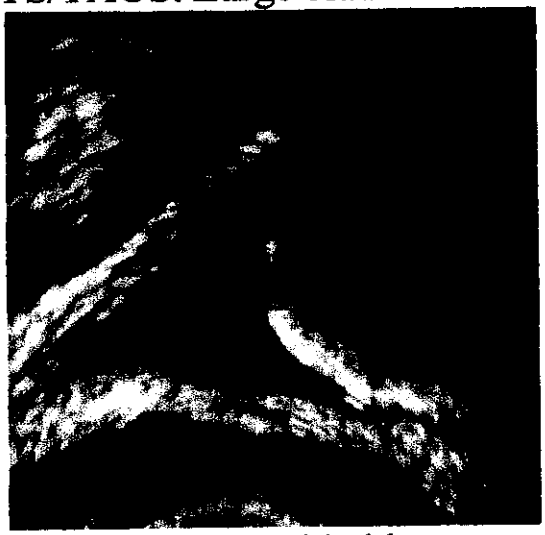
PUT: Multiple bladder stones.

TAUS: Multiple bladder stones.

TRUS: Multiple bladder stones.



TS/TAUS: Large bladder stone.



TS/TRUS: Large bladder stones.

LS/TRUS: Large bladder stone.

Case(4)

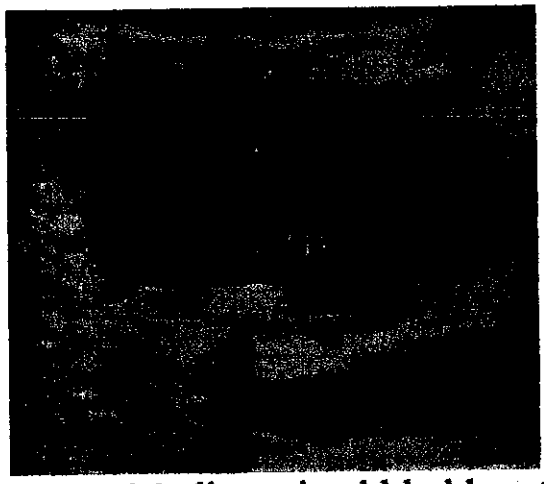
Case (4):

Clinical presentation: Irritative symptoms.

PUT: Large bladder stone.

TAUS: Large bladder stone.

TRUS: Large bladder stone.



TS/TAUS: Medium sized bladder stone.

TS/TRUS: Medium sized bladder stones.

Case(5)

Case(5):

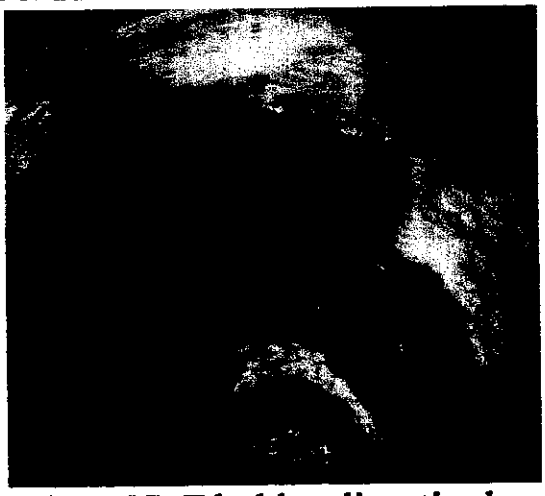
Clinical presentation: Irritative symptoms.

PUT: Medium sized stone bladder.

TAUS: Medium sized stone bladder.

TRUS: Medium sized stone bladder.

TS/TAUS: Bladder diverticulum.



TS/TRUS: Bladder diverticulum.

CASE (6)

Case(6):

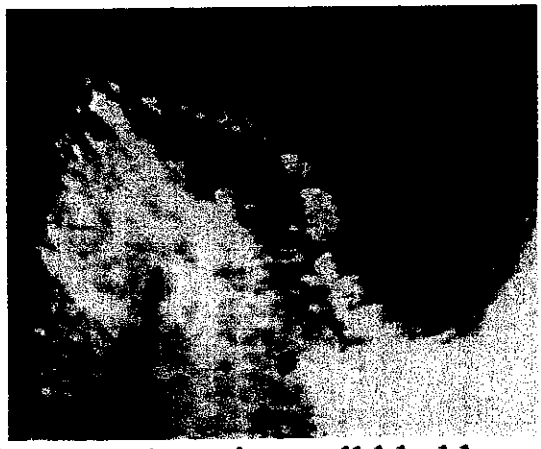
Clinical presentation: Recurrent urinary tract infection.

Put: Free.

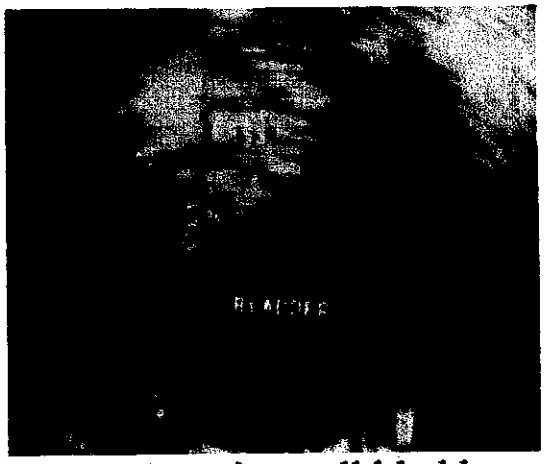
IVU: Bladder diverticulum.

TAUS: Bladder diverticulum.

TRUS: Bladder diverticulum.



LS/TAUS: Anterior wall bladder mass.

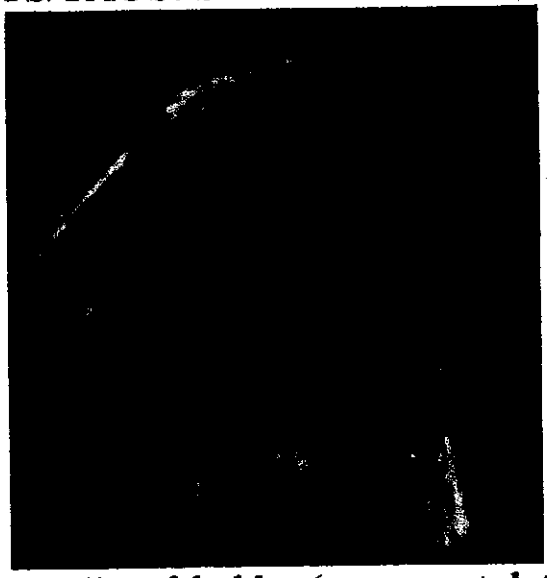


TS/TRUS: Anterior wall bladder mass.

Case(7)

Case (7):
Clinical presentation: Hematuria.
PUT: Free.
IVU: U.B. filling defect.
CT: anterior wall bladder mass.
Cystoscopy: anterior wall bladder mass.
TAUS: anterior wall bladder mass.
TRUS: anterior wall bladder mass.

TS/TAUS: Small bladder stone.



TS/TRUS: Free bladder (stone not detected).

Case (8)

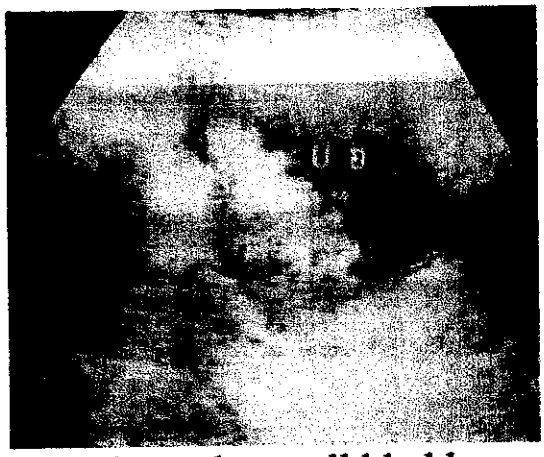
Case(8):

Clinical presentation: Irritative symptoms.

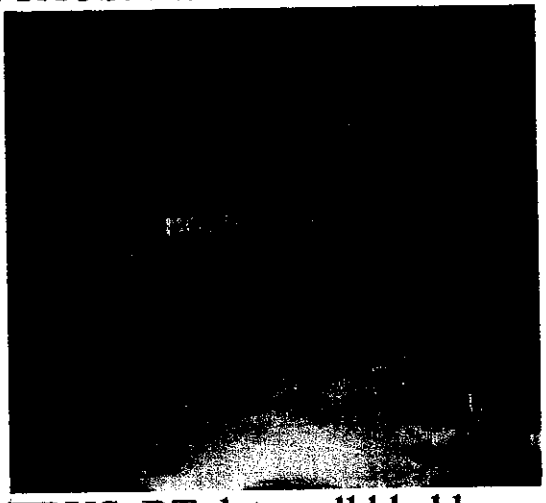
PUT: Small stone bladder.

TAUS: Small stone bladder.

TRUS: Free bladder (stone not detected).



LS/TAUS: Rt. lat. wall bladder mass.



LS/TRUS: RT. lat. wall bladder mass.

Case(9)