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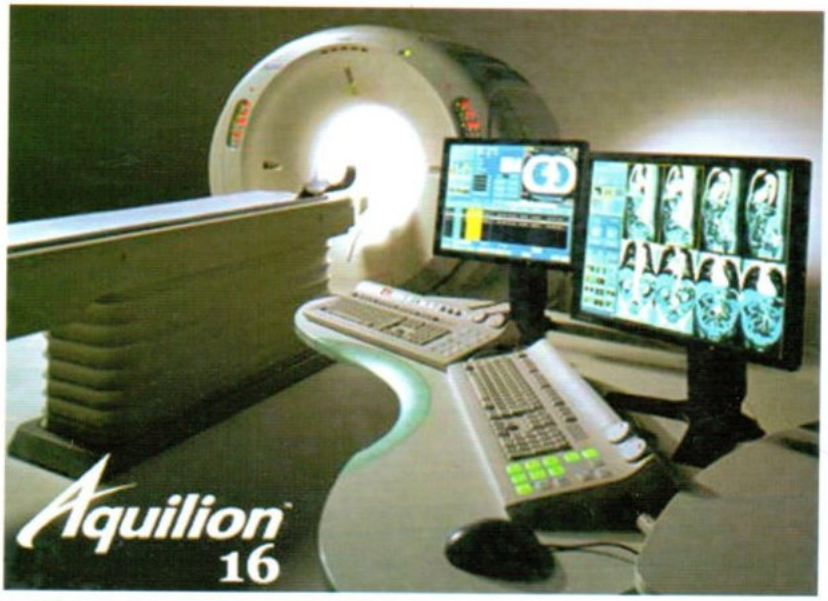

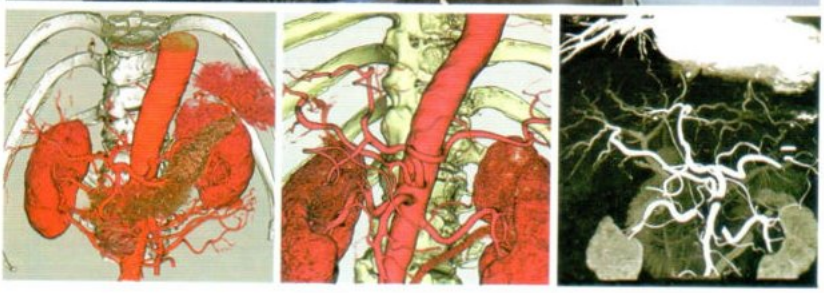

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CONTENTS

PERCUTANEOUS TRANSHEPATIC BILIARY DRAINAGE OF THE RIGHT HEPATIC LOBE USING THE SUBCOSTAL APPROACH WITH ULTRASOUND GUIDANCE

Wiwatana TANOMKIAT, MD

ABSTRACT

We present a method for performing transhepatic biliary drainage of the right hepatic lobe under real-time sonographic guidance. With the right subcostal approach, the peripheral bile duct of the anterior inferior right lobe was punctured providing sufficient intrabiliary distance for more multiple side holes to promote better drainage. This puncture site is more comfortable for the patient and easier to care for. With this technique, transpleural puncture or trauma to the intercostal vessels and nerves, which can be complications using conventional techniques, can be avoided. This route can also be used for subsequent permanent placement of the metallic stent. The results and limitations are discussed.

Key Words: Drainage, Percutaneous, Bile duct obstruction, Ultrasonography, Interventional, Subcostal

INTRODUCTION

Percutaneous transhepatic biliary drainage (PTBD) has been widely accepted for an effective temporary or permanent decompression of a biliary obstruction.[1-6] The conventional approach through the right hepatic lobe using a two-step method under fluoroscopic guidance is the most commonly used technique. However, this procedure needs a blind puncture of the right or common hepatic duct related to indirect anatomical landmarks, most often the T11, which may require several punctures. Morever, certain complications such as trauma to the diaphragm, pleura or intercostal artery and nerve have been reported. The PTBD of the left hepatic lobe with subxyphoid approach using a sonographic control is an alternative which can avoid these difficulties and complications. However, the left hepatic lobe in some patients is small and hidden in the bony thoracic cage, making such a left lobe approach impossible. We introduce the subcostal approach of the right hepatic lobe as another alternative which provides some benefits.

PATIENTS

Case 1: A 36 year-old man presented with jaundice. A physical examination confirmed the scleral jaundice and revealed hepatomegaly without tenderness.The blood chemistry showed 13.3 mg% of the total bilirubin and 11.4 mg% of the direct bilirubin. His sonography and computed tomography (Fig. 1) showed dilatation of the bile ducts in both right and left hepatic lobes with a normal-sized common bile duct. No mass was visible. Endoscopic retrograde cholangiography showed severe stricture of the common hepatic duct. The stricture involved the proximal ducts of

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the anterior segment of the right lobe, posterior segment of the right lobe and the left lobe resulting in separation of the dilated ducts (Fig 2). Failure to place a stent was due to very tight stricture regardless of dilatation with a balloon. PTBD was requested to decompress the biliary obstruction of the posterior segment of the right hepatic lobe which was the largest hepatic segment.

Case 2: A 66 year-old woman presented with jaundice and weight loss. Her serum biochemistry showed elevated both total and direct bilirubin (25.9 mg% and 22.3 mg% respectively). The computed tomography showed dilatation of the right and left intrahepatic bile ducts with obstruction at the level of the proximal common hepatic duct. Sonography demonstrated thickened wall of the common bile duct which was likely a malignant stricture. Endoscopic cholangiography showed a short segment of severe stricture involving the common hepatic duct and adjacent proximal ducts of both right and left hepatic lobes. Initial decompression was done with endoscopic placement of a 7 Fr stent in the CBD with its upper tip above the obstruction. During the 2-month follow up, 2 admissions were required because of high fever which was subsequently found to be cholangitis. During the second admission, septic shock with elevated serum bilirubin was noted and cholangitis following occlusion of the stent were considered. An emergency PTBD was requested.

Case 3: A 74 year-old man presented with progressive jaundice and pruritis. The physical examination revealed yellow sclerae and skin with a small soft mass at the right upper quadrant of the abdomen which could have been the distended gallbladder. His blood chemistry showed 31.9 mg% of total bilirubin and 26.6 mg% of direct bilirubin. The endoscopic retrograde cholangiography demonstrated severe 7-mm-long stricture of the common bile duct. Placement of the common bile duct stent was not possible due to failure of the guide wire to cross the obstructive point. PTBD was requested to decompress the biliary obstruction and to relieve the pruritis.

Case 4: A 77 year-old man was referred from another hospital after the endoscopic retrograde cholangiography demonstrated an obstruction at the mid part of the common bile duct. The patient subsequently developed a severe abdominal pain. His serum direct and indirect bilirubin levels were 10.60 and 12.90 mg%, respectively.

TECHNIQUE

With the patient in the supine position, the subcostal area at about the right anterior axillary line was chosen as the site of puncture. Sonography was performed and the dilated duct in segment 6 of the right hepatic lobe was demonstrated longitudinally. Deep inspiration was available to provide better demonstration but was not necessary in our cases. An 18-G puncture needle was used. After successful puncture, about 1mL of the bile was aspirated and sent for bacterial culture. A diluted contrast medium was injected for diagnosis. A guidewire was inserted and advanced under fluoroscopic control.

(Note: Passing successfully through the stenotic point may require a straight guidewire and control can be better with a 5 F cobra or straight catheter. However, if the stenotic site is severe and looks complete, the drainage catheter should be left distal to the obstructive point. After good drainage of the dilated bile duct distal to the occlusion and proper intravenous antibiotic for a week, the bile may become less viscous and the tissue around the stenotic point may be reduced and passing the stenotic site can be acchieved.)

In case 1, a 5 F cobra catheter and an angled Radiofocus guidewire were used. After the guidewire had crossed the stenotic point and its tip had reached the duodenum, the cobra catheter

was advanced until the tip of the catheter was in the ascending duodenum. The Radiofucus guidewire was replaced by a J-shaped heavy-duty guidewire. An 8 F catheter for both external and internal drainage was then inserted (Fig. 2).

In cases 2 and 3, the catheter was placed in the right hepatic duct for external drainage. The internal drainage in case 2 was achieved with revision of the common bile duct stent endoscopically.

In case 4, the catheter was placed in the common hepatic duct for 12 days. After his clinical condition improved, the spiral Z stent was placed via the same tract into the common bile duct across the stricture.

RESULTS

Case 1: The patient lived for 6 months after the placement of the PTBD. During that period, 4 admissions were required because of cholangitis. However, the catheter was in a good position and no obstruction or dilated bile duct was shown on a cholangiography. His serum total and direct bilirubin was at a near-normal level (2.35 mg% and 1.29 mg%, respectively). To decrease the cholangitis, the tip of the catheter was replaced in the dilated duct of the anterior segment of the right hepatic lobe proximal to the stricture (Fig 4). The patient refused the placement of the metallic stent, thus only external drainage was possible during his later treatment.

Case 2: During the 4-month follow-up after placement of PTBD, the patient had no fever or pain. Good external drainage and presence of normal serum bilirubin were noted. The follow-up was lost after this period.

Case 3: The subcostal PTBD was dislodged after 2 months following the initial placement. During this period, the pruritis completely disappeared. Progressive decrease of the serum bilirubin was noted. For more sterile procedure, the left hepatic lobe PTBD was subsequently performed.

Case 4: The abdominal pain, which was likely caused by cholangitis after the previous endoscopic retrograde cholangiography, disappeared shortly after the placement of the PTBD. Within 1 month after the placement of the metallic Z stent, his serum bilirubin level became normal.

Fig. 1. The computed tomography of case 1 shows dilatation of the right and left intrahepatic bile ducts as well as the atrophic left hepatic lobe.

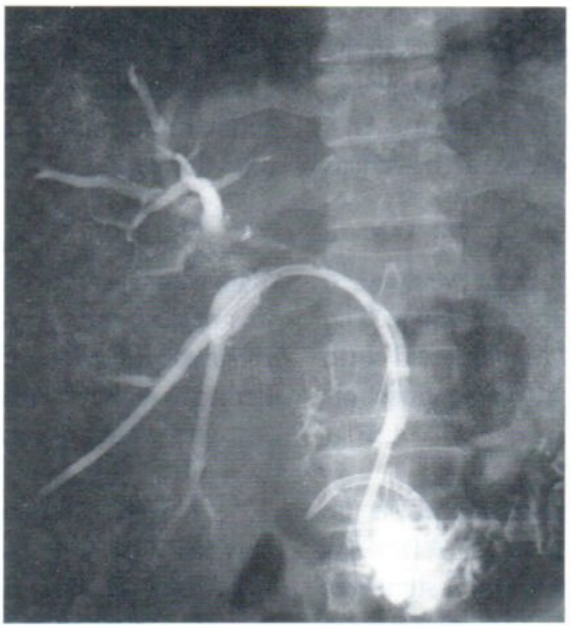

Fig. 2. The cholangiography shows that the stricture involved the proximal part of the ducts of the anterior and posterior segments of the right hepatic lobe. Note the sufficient intraductal distance of the catheter for more side holes to promote drainage. Also note the smooth alignment of the puncture site and the catheter with no association with the rib.

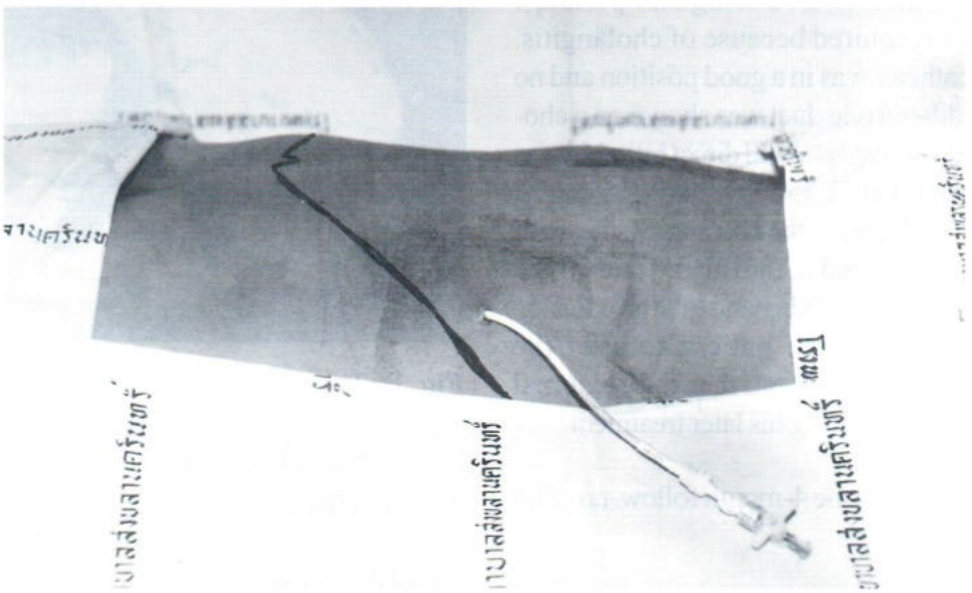

Fig. 3. The photograph shows that the puncture site was at the anterior axillary line which was more comfortable and easier to care for. The drawn line indicates the costal margin.

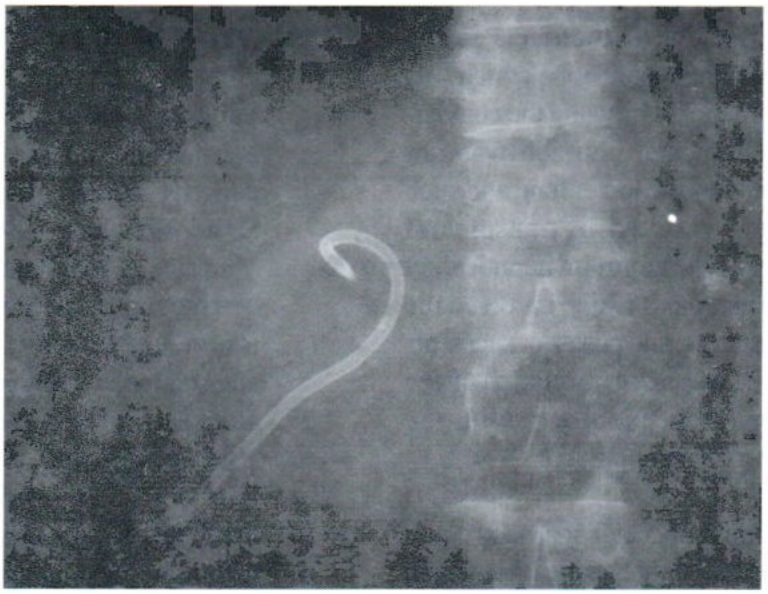

Fig. 4. A plain radiograph shows that the tip of the catheter could also be placed in the dilated duct of the anterior segment of the right hepatic lobe proximal to the stricture to provide simultaneous decompression of these 2 segments with a single catheter.

DISCUSSION

The subcostal approach PTBD through the anterior inferior duct of the right hepatic lobe gave an effective decompression of the biliary obstruction similar to the conventional method. In contrast to the conventional PTBD, which needs a blind puncture and 2-step technique, using a real-time sonographic guidance in the subcostal PTBD gave a more precise puncture of the bile duct, resulting in less time consumed and less trauma to the patient.[4-6] Moreover, transpleural puncture or trauma to the intercostal vessels and nerves which have been reported as complications in conventional PTBD with intercostal approach can be avoided.

Since the peripheral bile duct was punctured at the inferior liver margin far from the obstructive site, sufficient intrabiliary distance for more multiple side holes which could promote the better drainage was provided (Fig. 2). The puncture site was on an anterior axillary line that was more comfortable for the patient and easier tocare for (Fig. 3). The alignment of the puncture site and the catheter were in the same direction and not related to the rib (Fig. 2). With strong respiration, the catheter slightly but freely moved forth and back through the abdominal wall without being kinked by the ribs as observed in the intercostal approach of the conventional PTBD. In cases with separate dilatation of the ducts in the anterior and posterior segments of the right hepatic lobe, simultaneous decompression with a single catheter was possible with the subcostal technique (Fig. 4).

In case 1, who had separate dilatation of the anterior and posterior segments of the right hepatic lobe and PTBD of the left lobe was not possible, this subcostal PTBD was a the technique of choice to decompress the posterior segment of the

right hepatic lobe. Puncture of the ducts in the anterior segment of the right hepatic lobe which was inferior to the diaphragmatic dome using the conventional mid-axillary intercostal apprach was not possible since it is limited by the lower lung and such an attempt might have resulted in transpleural puncture. The stricture of the common hepatic duct with possible surrounding mass which involved the proximal ducts of the anterrior and posterior segments of the right hepatic lobe was also a limitation of the puncture of the common hepatic duct with the conventional right mid-axillary approach.

Limitations of this subcostal approach could be seen in cases with a small right hepatic lobe, which could be totally covered by the bony thoracic cage. In this setting, sonographic guidance can be enhanced with deep inspiration by the patient. However, this needs good patient cooperation.

This method is also suitable for the subsequent placement of a metallic stent as it was successfully performed in case 4.

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EVALUATION OF RENAL ARTERY STENOSIS WITH GADOLINIUM-ENHANCED MR ANGIOGRAPHY

Linda PANTONGRAG-BROWN, M.D. Priyanut ATIBURANAKUL, M.D. Mantana POTHISRI

ABSTRACT

Purpose: To determine the accuracy of gadolinium-enhanced breath-hold magnetic resonance angiography in the diagnosis of renal artery stenosis.

Material and Methods: Twenty-eight patients underwent gadolinium-enhanced magnetic resonance angiography (MRA) in order to assess renal arteries. Nine of these patients had digital subtraction angiography (DSA) for correlation. Twenty renal arteries of these nine patients were evaluated for presence or absence of renal artery stenosis, as well as location and severity of stenosis. Degree of stenosis was classified as mild (<30% narrowing), moderate (30-50% narrowing) and severe (>50% narrowing).

Results: Using DSA as a gold standard, sensitivity, specificity, positive predictive value, negative predictive value and total accuracy of MRA for detection of renal artery stenosis were 90.0, 80.0, 81.8, 88.9 and 85.0% consecutively.

Conclusion: Gadolinium-enhanced MRA is a good imaging modality with minimal invasion for screening of renal artery stenosis. The most important role of MRA is its high negative predictive value. If MRA shows no evidence of renal artery stenosis, there is no need for angiography. Angiography should be performed in positive MRA cases in order to confirm the presence of stenosis, to correctly define the degree of stenosis and eventually to perform angioplasty in certain cases.

INTRODUCTION

Renal artery stenosis is an important and treatable cause of hypertension and progressive renal insufficiency. At present time, the gold standard for diagnosis of renal artery stenosis is digital subtraction angiography (DSA). Non-invasive imaging modalities of the renal arteries include Doppler sonography, contrast-enhanced Computed Tomographic Angiography (CTA) and gadolinium -enhanced Magnetic Resonance Angiography (MRA).

Gadolinium-enhanced MRA has several advantages over intra-arterial DSA and CTA. Intravenous contrast agents, used in DSA and CTA, are potentially toxic to kidneys and in certain cases are contraindicated if renal impairment is severe. In contrast, gadolinium used in MRA is quite safe and recommended in cases of renal insufficiency. Catheter-induced artheroembolism from DSA is not an uncommon complication [1], which is of no concern in MRA. All these advantages make gadolinium -enhanced MRA a potential screening method for patients whose renal artery stenosis is suspected.

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The purpose of this study was to evaluate diagnostic accuracy of renal artery stenosis by gadolinium-enhanced MRA in our institution, using DSA as a method of reference.

MATERIALS AND METHODS

From January 2000- December 2001, 51 patients were scheduled for MRA of renal arteries at our institution. Of these 51 patients, 28 had the images available for review and were the subjects of our study. Of these 28 patients, 15 were male and 13 were female with an average age of 59 years (range, 10-87 years). Nine of 28 patients had DSA, performed for confirmation and as a gold standard for renal arteries assessment. Other 19 patients did not have DSA and only MRA results were reported.

All renal arteries were analyzed retrospectively. The number of renal arteries, the presence or absence of renal artery stenosis, as well as location and severity of stenosis were assessed. Degree of stenosis was determined by the percentage of lumen narrowing. It was classified as mild (< 30% narrowing), moderate (30-50% narrowing) and severe (> 50% narrowing).

MR Imaging Technique

MR Imaging was performed with a 1.5 teals MR imager (Signa Horizon, GE, USA) using a phased array body coil. Axial spin echo T1W (TR 400-800 msec/TE 8-9 msec) and axial fast spin echo T2W (TR 4000-6000msec/TE 84-91msec) were performed for general evaluation of upper abdomen and kidneys. Location of peri-renal abdominal aorta was localized at sagittal plane using fast gradient -recovery-echo (FGRE) pulse sequence (TR 100 msec/TE min, flip angle 20 degrees) or spin echo T1W (TR 300 msec /TE min). Gadopentetate dimeglumine (Magnevist, Schering, Germany), 0.4 ml/kg or about 20 ml, was injected via the MR-compatible power injector, followed by a saline flush of 10 ml, at a rate of 2-3 ml/sec. MRA was performed using Smart Prep technique with software package provided by GE. Timing of arrival of contrast agent in the peri-renal aorta was depicted automatically by Smart Prep, triggering the first pass of the sequence. Three passes of breath hold, three-dimensional time of flight, fast spoiled gradient-recalled-echo (3D TOF FSPGR) pulse sequence with fat suppression technique were performed in the coronal plane. Images of these 3 passes were reviewed and the best one was selected for reformation at MR workstation. Both source and reformatted images were analyzed. Finally, post contrast axial and coronal FSPGR T1W with fat suppression (TR 100-150msec/TE min, flip angle 60 degrees) of the upper abdomen were performed for general surveillance.

Statistic Analysis

Sensitivity, specificity and predictive values of MRA as a diagnostic test for renal artery stenosis were analyzed, using DSA as the method of reference. These parameters were compared with others published in the literature.

Definition

- Sensitivity = True positive/ True positive + False negative
- Specificity = True negative/ True negative + False positive
- Positive predictive value = True positive / True positive + False positive
- Negative predictive value = True negative / True negative + False negative
- Total accuracy = True positive + True negative / All patients in the study

RESULTS

I) MRA of renal arteries with DSA correlation

In this group, 9 of 28 patients had both MRA and DSA performed.

Number of renal arteries

In 9 patients, 20 renal arteries were identified on MRA. Seven patients had single right and left renal arteries. One patient had single right renal artery and double left renal arteries, and one patient had single left renal artery and double right renal arteries. The number of renal arteries, visualized on MRA, was all corresponded to finding on DSA.

Renal artery stenosis assessment (Table I)

TABLE 1 Comparison of stenosis grading by MRA versus DSA

Grading on DSA	Grading on MRA				Total
	Normal	Mild	Moderate	Severe	
Normal	8	1	-	1	10
Mild	-	1	4	-	5
Moderate	1	-	1	-	
Severe	-	-	-	3	3
Total	9	2	5	4	20

Mild stenosis, < 30% of diameter reduction,
Moderate stenosis, 30-50% of diameter reduction,
Severe stenosis, > 50% of diameter reduction.

Using DSA as a gold standard, 10 renal arteries were normal and 10 renal arteries had stenosis. Of the 10 stenotic arteries, 9 located at main renal artery and 1 at segmental branch of renal artery. Of 10 normal renal arteries, MRA showed 8 true negative and 2 false positive (1 mild, 1 severe stenosis). Renal artery, interpreted as severe stenosis on MRA, was found to be a kinking renal artery on DSA (Fig 1). Of 10 stenotic renal arteries, MRA showed 9 true positive (Fig 2,3) and 1 false negative (Fig 4). Location of stenosis in 9 renal arteries, detected by MRA, was all at the main renal arteries. The only false negative, found on MRA, was secondary to location of stenosis, which was in the segmental branch (Fig 4).

In 10 stenotic renal arteries, detected by DSA, 5 arteries were shown to have the same degree of stenosis by MRA (1 mild, 1 moderate, 3 severe). Four renal arteries showed mild degree of stenosis on DSA, but moderate degree on MRA (Fig 5). One renal artery shown moderate degree of stenosis at segmental branch (Fig 4), but interpreted as normal by MRA (same patient mentioned above, as a false negative).

Regardless of degree of stenosis, sensitivity, specificity, positive predictive value, negative predictive value and total accuracy of MRA for detection of renal artery stenosis were 90.0, 80.0, 81.8, 88.9, 85.0 % consecutively. These parameters were compared with others, which were published in the literature [2-6] (Table 2).

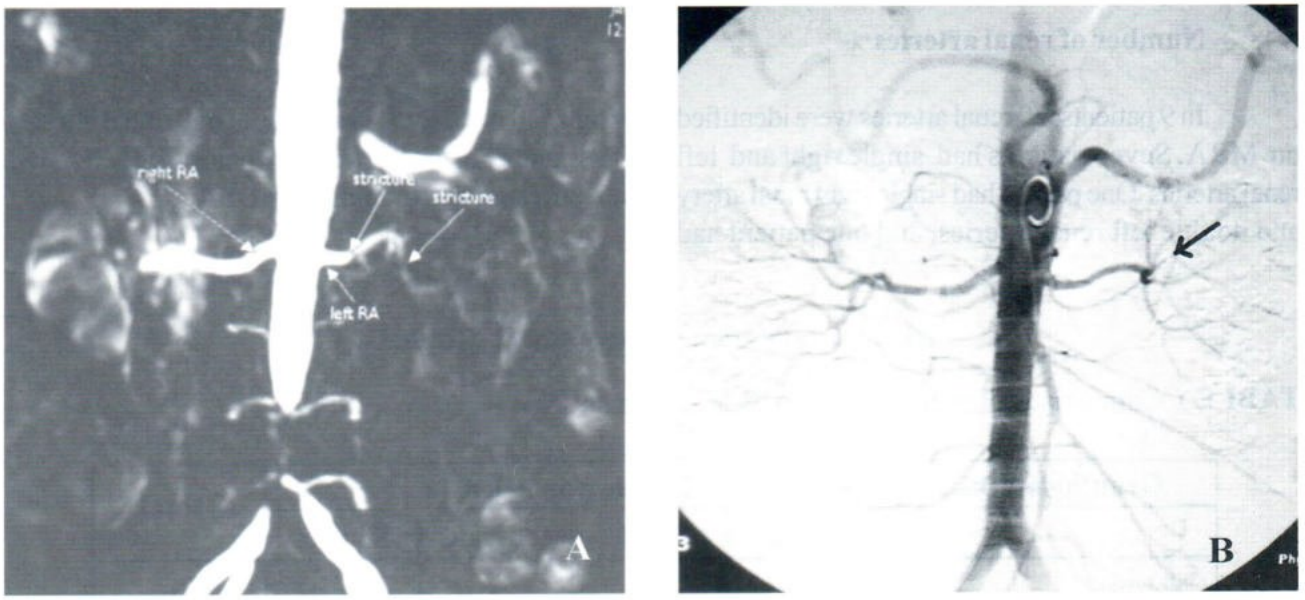

Fig.1 A-66-year-old woman presented with DM and hypertension. (A) MRA shows severe stenosis of proximal and distal parts of left renal artery, but (B) DSA shows kinking distal part of left renal artery without evidence of stenosis (false positive MRA).

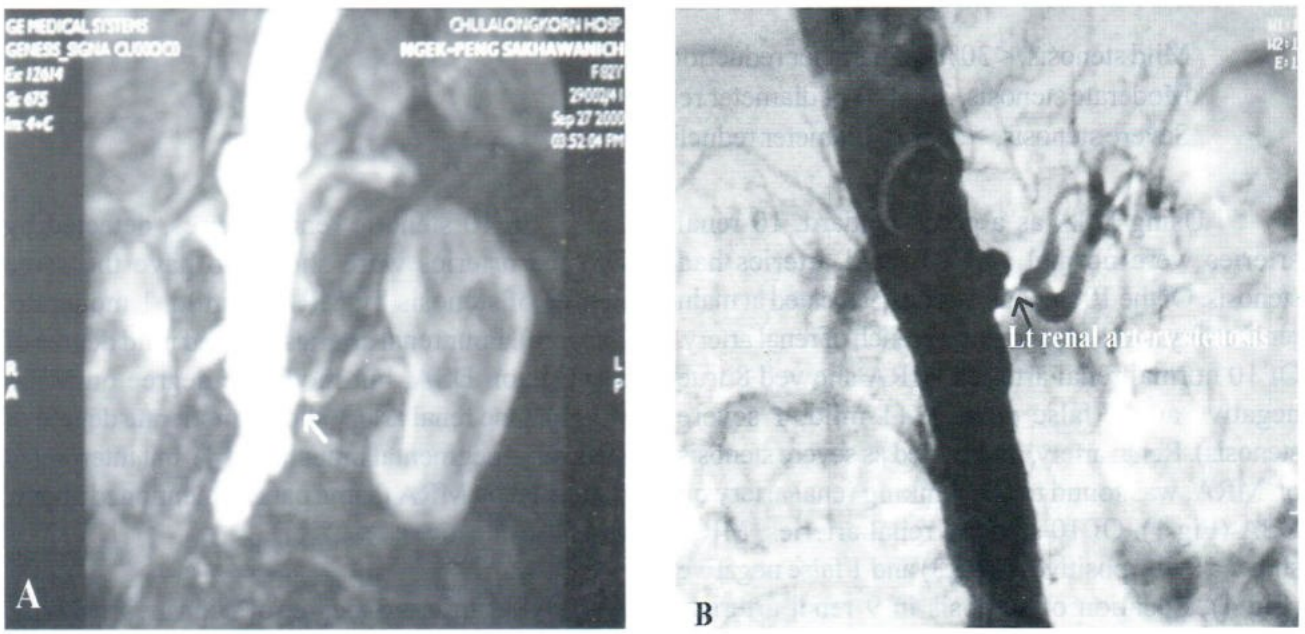

Fig 2 A 82-year-old woman presented with DM, hypertension and chronic renal failure. (A) MRA and (B) DSA show severe stenosis of left renal artery (true positive MRA).

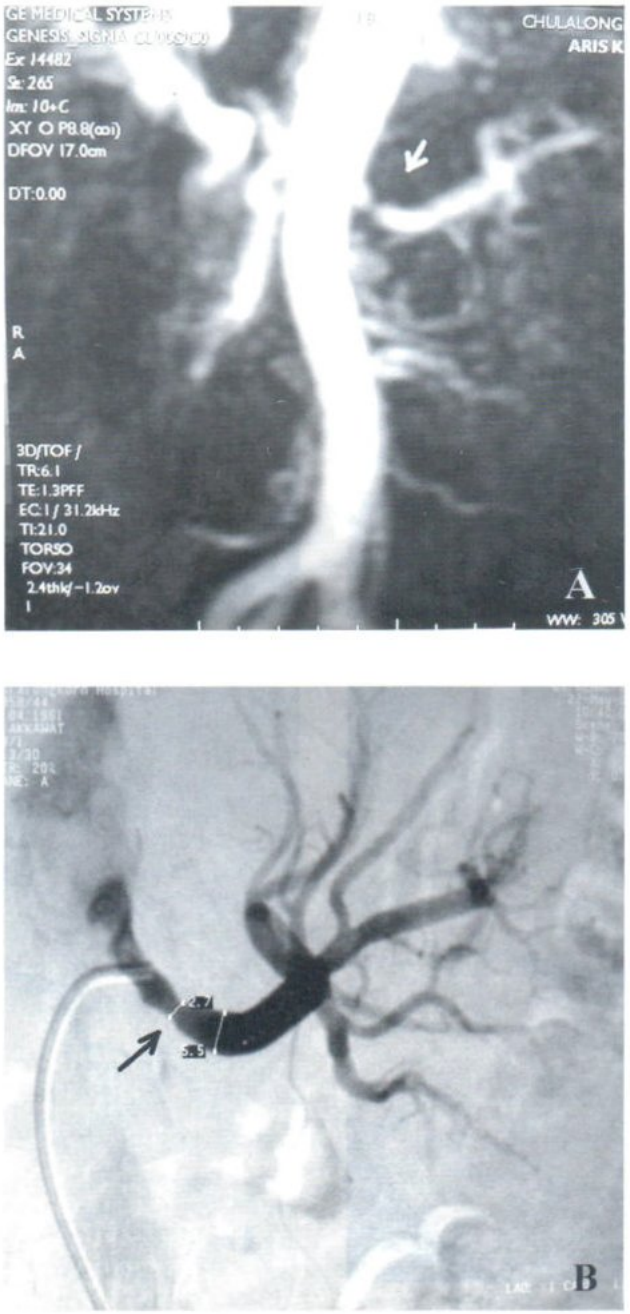

Fig. 3 A 40-year-old woman presented with malignant hypertension. (A) MRA and (B) selective left renal DSA show moderate

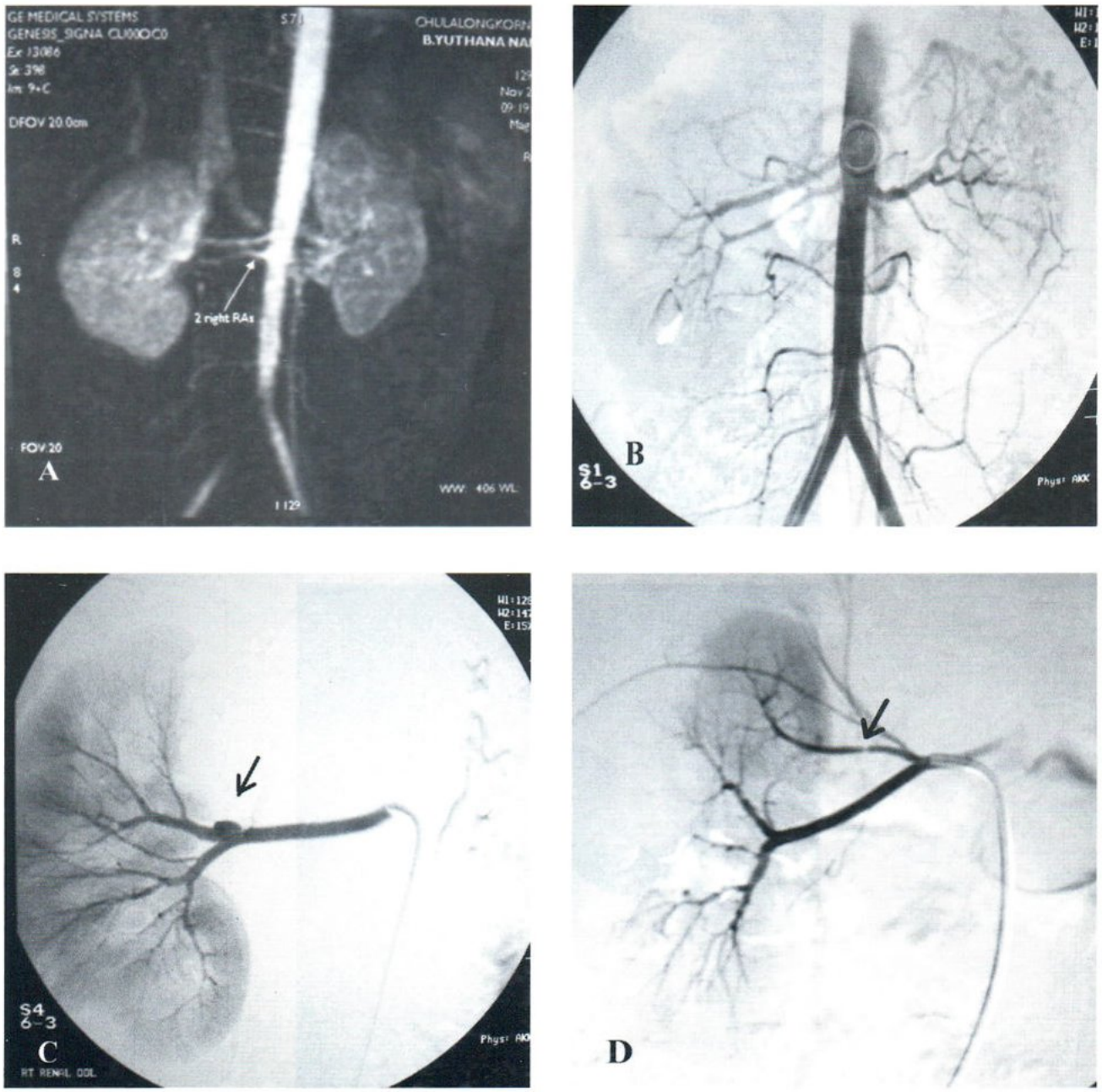

Fig. 4 A 10-year-old boy presented with hypertension. (A) MRA and (B) DSA show single left renal artery and double right renal arteries without evidence of renal artery stenosis. (C) Selective right upper renal angiography shows small aneurysm at just proximal to its bifurcation. (D) Selective right lower renal angiography shows 50% stenosis at segmental portion (false negative MRA).

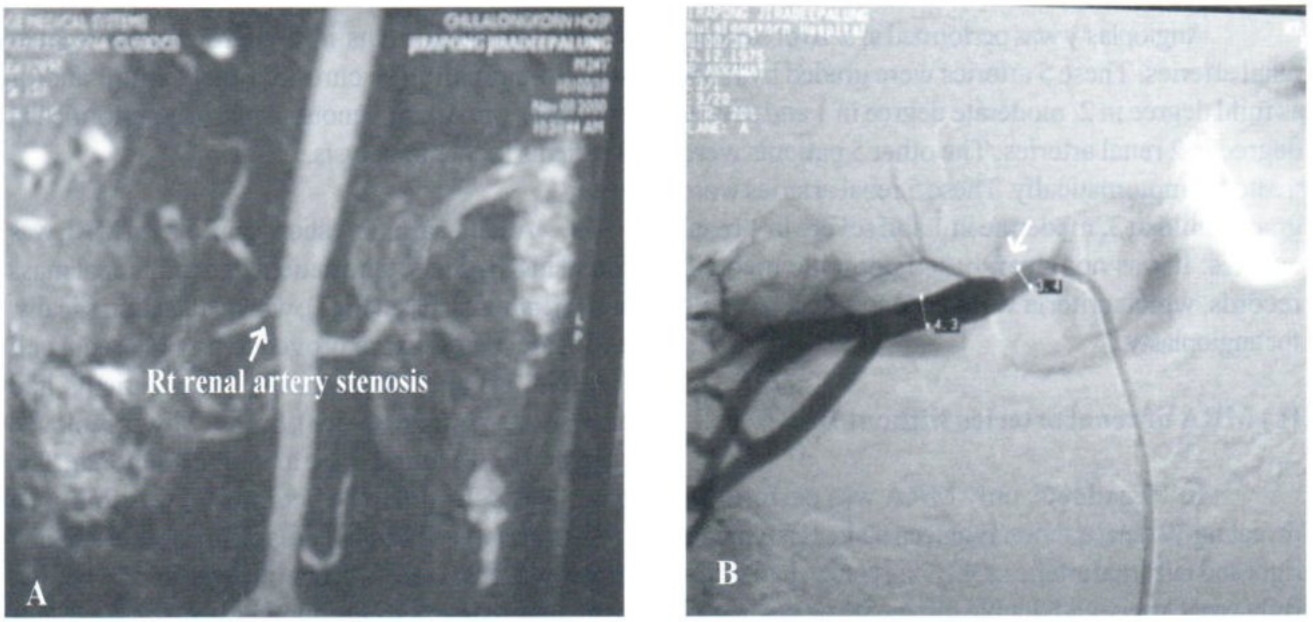

Fig.5 A 26-year-old man presented with hypertension. (A) MRA shows moderate stenosis of right main renal artery. (B) Selective right renal angiography shows mild stenosis of right main renal artery (true positive, but overgrading MRA).

TABLE 2 Comparison of sensitivity, specificity, positive predictive value, negative predictive value and accuracy of this study and others.

	Our study	Bakker et al (1)	De cobelli et al (4)	Korst et al (14)	Thornton et al (22)	Volk et al (24)
Sensitivity	90.0	97.0	94.0	100.0	100.0	92.0
Specificity	80.0	96.0	88.0	85.0	98.0	83.0
Positive predictive value	81.8	91.0	89.0	85.7	-	-
Negative predictive value	88.9	99.0	94.0	100.0	-	-
Accuracy	85.0	-	91.0	-	99.0	85.9

Angioplasty was performed in 5/10 of stenotic renal arteries. These 5 arteries were graded by DSA as mild degree in 2, moderate degree in 1 and severe degree in 2 renal arteries. The other 5 patients were treated symptomatically. These 5 renal arteries were graded mild in 3, moderate in 1 and severe in 1 renal arteries. It was not clear, based upon the medical records, which criteria were used to select patients for angioplasty.

II) MRA of renal arteries without DSA

In 19 patients, only MRA was performed, revealing 39 renal arteries. Eighteen patients had single right and left renal arteries. Only one patient had single right renal artery and double left renal arteries. Of 39 renal arteries, 27 arteries were normal and 12 showed stenosis. These 12 stenotic renal arteries were all located at main renal arteries and were graded as mild in 1, moderate in 4 and severe in 7 renal arteries (Fig 6).

All 19 patients in this group were treated symptomatically for chronic renal failure and/or hypertension. Arteriovenous fistula was performed in 3 patients for hemodialysis.

Additional information, gained form MRI, was found in 8 patients. One patient had right renal mass and left adrenal mass (Fig7), which treated surgically, and these masses were proved to be right renal cell CA and left adrenal adenoma. Two patients had adrenal masses (one of each), but only 1 was removed surgically and found to be a benign adenoma. The other was believed to be benign and was followed up. Three patients had liver masses (one of each) and these masses were all characteristic for benign hemangiomas and were followed up. Three patients had small abdominal aortic aneurysms and were all followed up (Fig 8). One patient showed perinephric hematoma form prior renal biopsy and was also followed up.

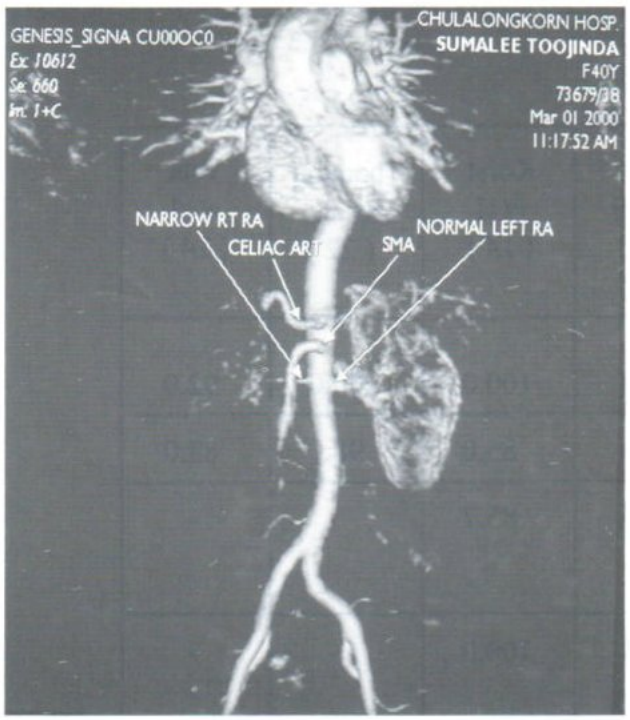

Fig. 6 A 42-year-old woman presented with hyper tension, MRA shows diffuse narrowing of right renal artery with normal left renal artery.

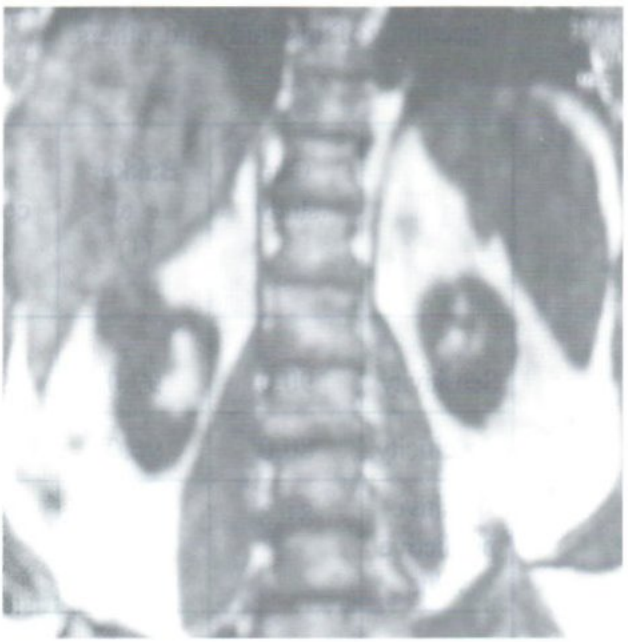

Fig.7 A 61-year-old man presented with acute on top chronic renal failure, MRA shows a 3.3x3.8 cm right renal cell mass, which was proved to be a renal cell carcinoma.

Fig.8 A 65-year-old woman presented with hyper tension and chronic renal failure, MRA shows fusiform aneurysm of abdominal aorta.

DISCUSSION

In our study, a total of 59 MRA of renal arteries were performed, but only 20 arteries had DSA for a standard of correlation. Although the number of MRA of renal arteries with DSA correlation is rather small, it is very useful for preliminary analysis and provides us with important information. The number of renal arteries on both left and right sides, either single or double, were all correctly depicted by MRA in this study. High accuracy of MRA for detection of number of renal arteries has been well publicized [3,7,13]and is now accepted to replace angiography in preoperative assessment of potential renal transplant donors. [11-12,14]

Sensitivity of MRA for detecting renal artery stenosis in our study was 90% (9/10) which is comparable to other studies (Table 2). [2-10,13,15-20] One false negative case was secondary to the location of stenosis, which was at the segmental branch, not at the main renal artery (Fig 4). At present time, MRA is still not good enough to reveal the abnormality of the medium to small sized vessels, and the abnormality largely depends on angiography.[2,4,6,9,13-14,17-18,20-22] Therefore, a false negative in this artery was actually unavoidable. If this renal artery is excluded, the sensitivity and negative predictive value will rise to 100%. High negative predictive value is very important for MRA as a screening test for renal artery stenosis, so that cases, interpreted as no stenosis, do not need to have angiography. Angiography should be performed only in positive MRA cases.

In terms of luminal narrowing, MRA tends to exaggerate the degree of stenosis. This is secondary to signal loss from slow or reduced flow.[23] In our cases, 4 renal arteries were over interpreted as moderate degree of stenosis (30-50% narrowing),

but showed mild degree (< 30% narrowing) on DSA. Therefore, the decision of angioplasty has to be made upon the finding on angiography, not by MRA. In general, angioplasty is performed if there is more than 50% narrowing,[24] which is regarded as hemo dynamically significant.[3,6-8,21]

Ten renal arteries, proved to be normal by DSA, were correctly identified by MRA in 8 arteries (specificity 80%). One false positive artery was secondary to kinking of the vessel on DSA. Kinking or tortuous vessel causes flow dynamic alteration creating signal loss on MRA.[23] This MRA pitfall has been recognized and published previously.[17,22]

Another 39 renal arteries of which only MRA were performed, 12 renal arteries were actually interpreted as stenosis. The reason for not performing DSA was not clear. Based upon the retrospective review on medical records, we predicted that benefits for angioplasty in these cases were small, and supportive treatment was the only choice of therapy in these patients.

One advantage of MRA over angiography is that it could detect other abnormalities, which otherwise are not suspicious clinically. As shown in our cases, right renal cell carcinoma, left adrenal gland tumors, liver tumors and abdominal aortic aneurysm were detected. MRI, routinely performed with MRA, plays an important role for delineation of these abnormalities.

In conclusion, our study concurs with other studies, which indicate that MRA is a good imaging modality for screening of renal artery stenosis. The most important role of MRA is its high negative predictive value. If MRA shows no evidence of renal artery stenosis, there is no need for angiography. Angiography should be performed in positive MRA cases for confirmation, correctly defining the degree of stenosis and eventually performing anigoplasty in certain cases.

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LARGE EPIDERMAL INCLUSION CYST OF THE MALE BREAST: A CASE REPORT

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ABSTRACT

A case of a large epidermal inclusion cyst was diagnosed in a 40 year- old man, presented with a left breast mass. Mammogram demonstrated a well- circumscribed mass occupying almost the entire left breast. Ultrasound showed a well-defined heterogeneous hypoechoic mass with through-transmission. Surgical excision of the mass revealed an epidermal inclusion cyst.

INTRODUCTION

Epidermal inclusion cyst of the breast is rare, particularly in the male breast. We report mammographic and ultrasonographic features of a large epidermal inclusion cyst in a 40 year- old man. Surgical excision was performed and the pathologic result verified the diagnosis.

CASE REPORT

A 40 year-old man presented with a painless left breast mass for ten years. The mass was growing slowly. Physical examination revealed a firm mass occupying almost the entire left breast. It's palpable size was measured approximately 5 x 8 cm (Figure 1). There was no skin change or axillary adenopathy. Mammographic study showed a 4.2x6.1x6.4 cm well-circumscribed mass, without microcalcification. Minimal subareolar fibroglandular tissue was seen in the right breast (Figure 2). Ultrasonography (US) of the breast showed a large well -defined oval shaped heterogeneous hypoechoic mass with posterior enhancement. No vascular flow was detected within the mass (Figure 3). The patient underwent surgical excision of the breast mass due to its large size and possible malignant transformation. Histologic study revealed an epidermal inclusion cyst without malignancy (Figure 4-5).

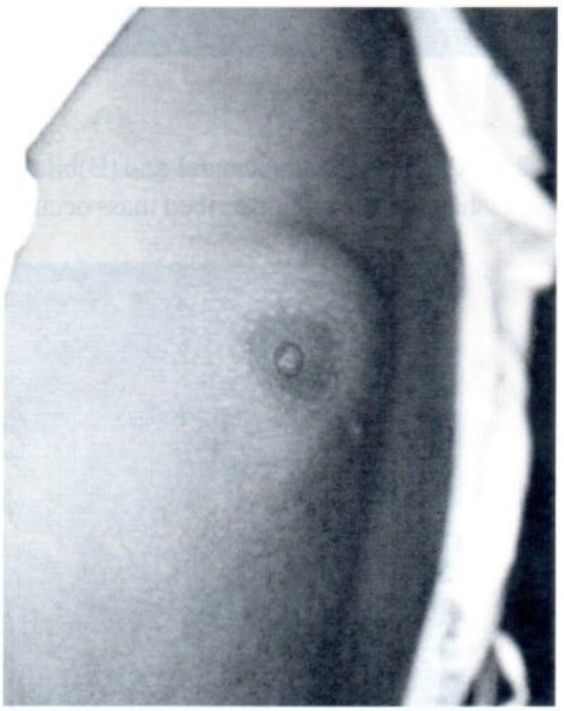

Fig. 1 Photograph shows a large mass in the left breast.

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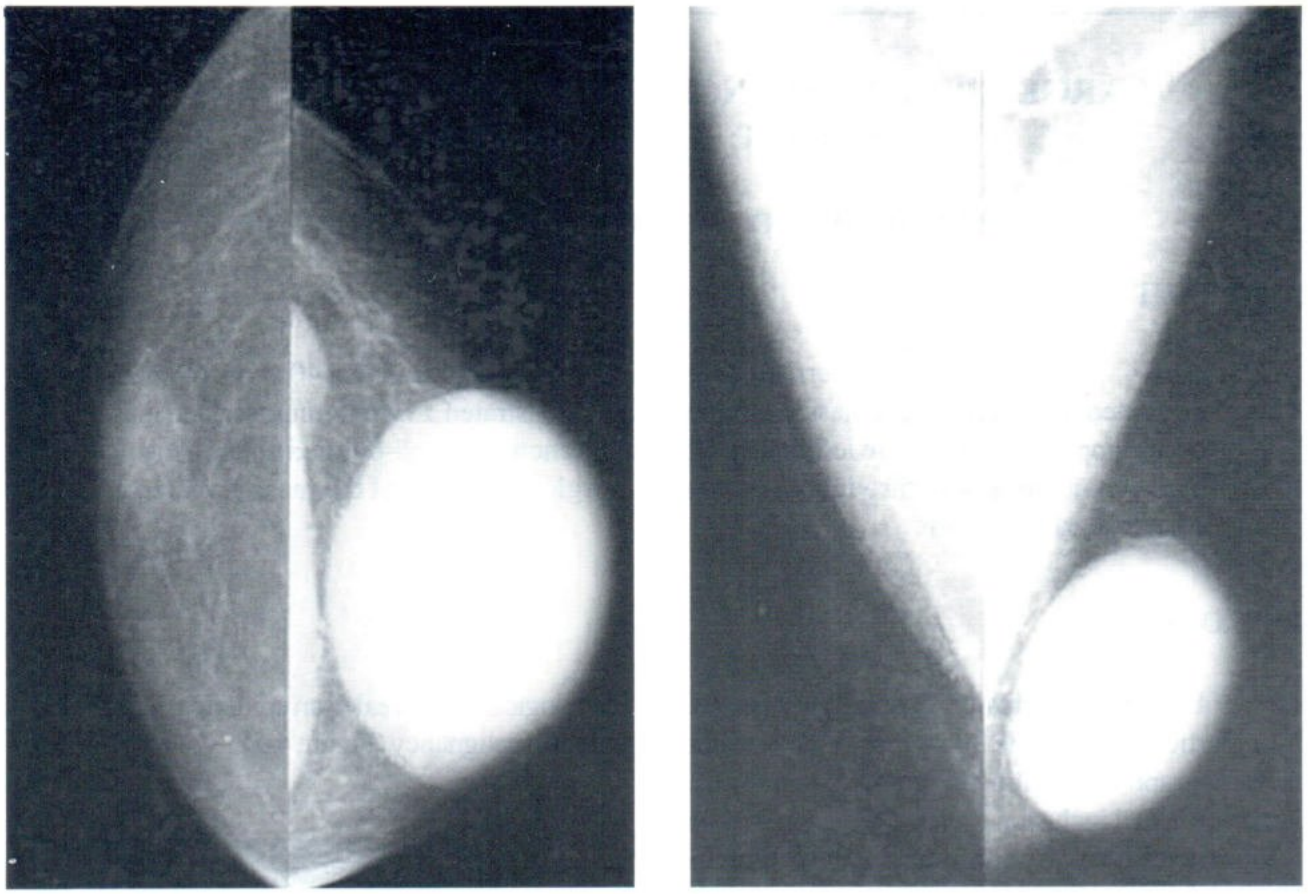


A B

Fig. 2 (A) Bilateral craniocaudal and (B)bilateral mediolateral oblique mammograms shows a large oval shaped well-circumscribed mass occupying almost the entire left breast.

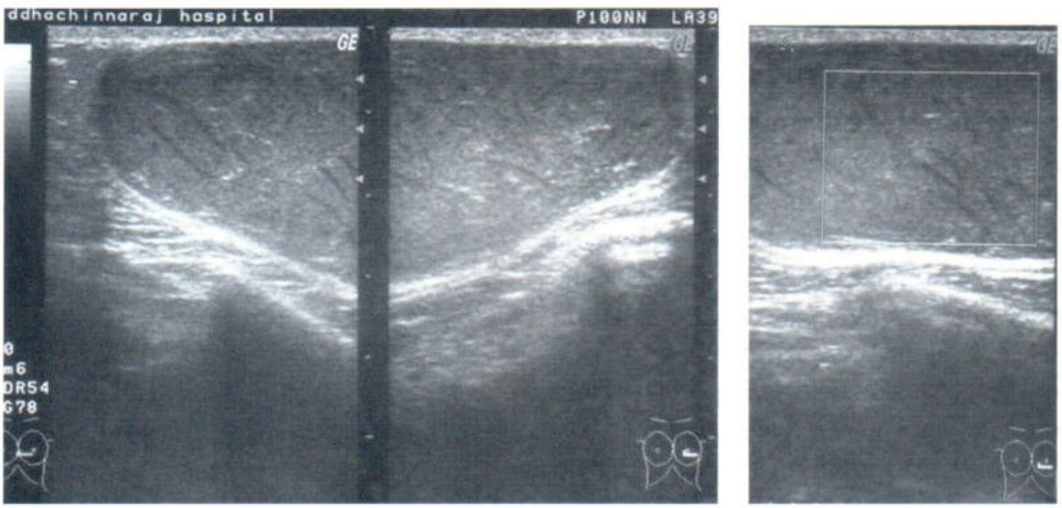
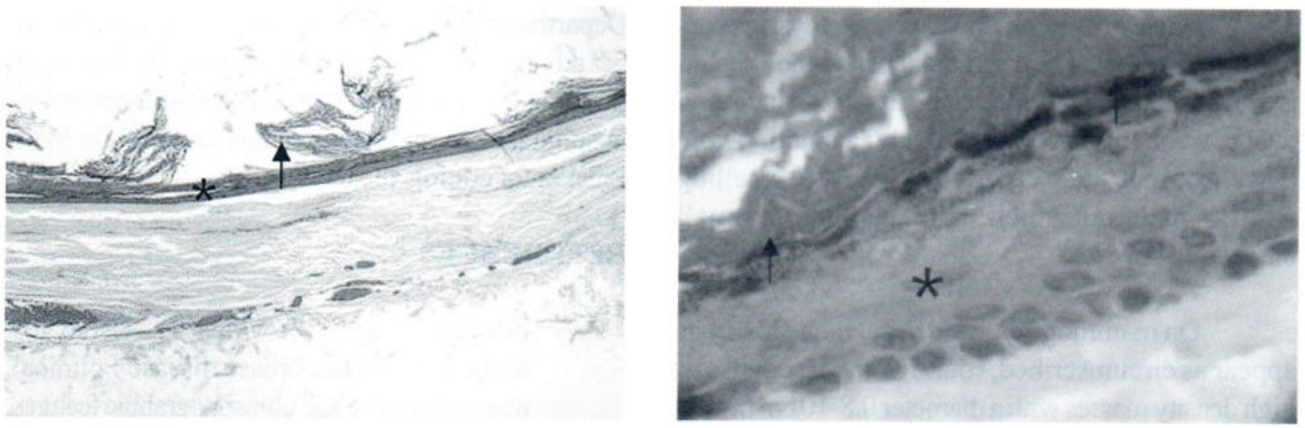


Fig. 3 (A) Transverse US scan shows a large well-circumscribed hypoechoic mass with posterior enhance ment. (B) Color Doppler US scan shows no vascular flow inside the mass.

Fig 4 Gross specimen shows an encapsulated mass.



A B

Fig 5 Photomicrographs (A) Low power magnification(H&Ex100) shows well-defined cyst wall, lined by attenuated squamous epithelium(asterisk). The cyst contains laminated keratin content(arrow) (B) High power magnification(H&Ex400) shows attenuated squamous epithelium (asterisk) and laminated keratin(arrow).

DISCUSSION

Epidermal inclusion cyst of the male breast is rare, about 0.004 % of Gunhan-Bilgen series.[1] Epidermal inclusion cyst, the most common epithelial cyst, can be found at any site of the skin surface and also involved breast, usually found near the inframammary fold or near the axilla.[2-4] It's often erroneously referred to as a sebaceous cyst. Sebaceous cyst applied only to epithelial cysts that contain sebaceous glands and appear on mammogram as radiolucent lesion because of the fatty component.[2, 5-6] Epidermal inclusion cysts are composed of stratified squamous epithelium that is nearly identical to that of the epidermis and do not contain sebaceous glands. These cysts are filled with keratin. Calcifications may be found within the keratin debris. Epidermal inclusion cysts may be congenital or may arise from obstructed hair follicles,squamous metaplasia of the ductal epithelium or trauma and even post biopsy or reduction mammoplasty.[2-3, 7-9]

Clinically, an epidermal inclusion cyst appears as a round smooth firm mass attached to the skin but is movable against the underlying tissue. An inclusion cyst is frequently accompanied by a small visible blackhead and there is periodically a foul smelling whitish material which exudates from a small blackened pore.[2,4,9]

On mammogram, epidermal inclusion cysts appear as circumscribed, round or oval isodense or high density masses with a diameter 0.8-10 cm in size, and rarely more than 2 cm. It may contain microcalcifications.[2-4, 8-9] US appearance of epidermal inclusion cysts has been described as a well-circumscribed,hypoechoic and solid or complex -appearing mass due to thick keratin content. Through transmission is present. Most cases are located between the echogenic lines that represent the superficial and the deep dermal layers. This appearance suggested cutaneous origin.[2,4,10]

Complications of an epidermal inclusion cyst include spontaneous rupture with inflammation and infection, hemorrhage and malignant transformation have been reported. If the epidermal inclusion cyst was ruptured, it may show lobulated contour. Color Doppler signals are absent in most cases, but some vascularity can be found in ruptured or complicated cysts.[2,4,10-11]

In conclusion, breast mass in males is rare and a large epidermal inclusion cyst is even rarer. Its large size gave an appearance of malignancy. Mammographic and ultrasonographic appearance of a well-circumscribed mass is suggestive of a benign lesion. However, biopsy may be necessary for the differentiation of epidermal inclusion cyst from a circumscribed malignancy.[2,12-14]

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IMAGING FINDINGS IN GALL BLADDER CARCINOMA IN NORTH-EASTERN THAILAND

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ABSTRACT

Early detection of gallbladder carcinoma is difficult. The objective of this study was to review the imaging findings that could be found in carcinoma of the gallbladder, as an attempt to identify more details, which might be helpful for future sooner diagnosis of this disease.

All imaging studies including US, CT and MRI of 21 patients with pathological proven carcinoma of gall bladder in 6-year-period. The patients were 15 women and 6 men, mean age 64 years. Abdominal pain was the most frequent presentation. Polypoid mass within gall bladder lumen was the most common finding; 83.3 % US, 75 %CT, followed by gallstones (41.6 %- US), focal wall thickening (33 %- US), lymphadenopathy (33 %- CT), liver invasion (25 %- CT), IHD dilatation (25 %- CT), and mass obscured gall bladder (8.3 %- US, 25%- CT).

CT is superior to US in identifying the extension of disease and tumor staging. But US is preferred as the first line of investigation. Various manifestations of gall bladder carcinoma will be presented. If the disease recognized and managed properly, the patient's life expectancy will be improved.

INTRODUCTION

Primary carcinoma of gall bladder is an uncommon malignancy with a distinctive demographic and geographic distribution. In the United State, it also ranks as the sixth most common gastrointestinal malignancy, following cancer of the colon, pancreas, stomach, liver and esophagus.[1] It is also the sixth among gastrointestinal malignancy in Khon Kaen.[2] The incidence was 1.7% of all gall bladder diseases (18 cases in 2 years in Khon Kaen regional hospital).[3]

Gall bladder carcinoma is highly lethal because its anatomic factors promote early spread. This tumor invades liver and surrounding structures including the biliary tree. The other reason is its difficulty to be detected early or diagnosed preoperatively. Despite the widespread use of modern imaging techniques, there are still no specific signs, resulting in high mortality rate because of delayed diagnosis. The median survival is 6 months after diagnosis indicating that the majority of patients present with advanced disease.[1] The purpose of this research was to analyzed the imaging patterns of carcinoma of the gall bladder including ultrasound,

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CT and MR imagings.

MATERIALS AND METHODS

We underwent a retrospective study of 21 patients with gall bladder carcinoma treated in Srinagarind Hospital, Khon Kaen University, between January 1995 through December 2001. There were US-9 cases, CT-8 cases, both US and CT-3 cases, both MRI and CT-1 case. All patients were operated and the specimens proved pathologically. The images were reviewed by an experienced radiologist. The Hitachi EU with noncontrast and postcontrast enhancement. One patient underwent abdominal MRI using 1.5 Tesla permanent magnet (GE, Signa ® Horizon LX ™). The technique was composed of axial FMSPGR in phase, oppose phase, T2W FSE (TR=6000, TE=86), MRCP-2d T2W FSE without breath hold, followed by dynamic gadolinium enhancement.

The specific factors analyzed were the imaging findings, and other correlate factors including patients' demographic data, clinical presentations, and histologic findings.

RESULT

There were 21 patients (15 females and 6 males). The female to male ratio was 2.5:1. Their age ranged from 37 to 80 (mean 64).

The most common clinical presentation was abdominal pain or discomfort (15/21, 71.4%). The presentations are displayed in table I.

The distinctive ultrasound features in order of frequency were polypoid mass in gall bladder

TABLE I Clinical presentations

Clinical presentations	**Number of patients (n =21)**	**Percentage**
Abdominal pain/ discomfort	15	71.4
Palpable abdominal Mass	2	9.52
Jaundice	1	4.76
Massive GI bleeding	1	4.76
Fever with abdominal pain	1	4.76
Asymptomatic	1	4.76

lumen (10/12, 83.3 %), followed by gallstones (5/12, 41.6%), focal wall thickening (4/12, 33.3%), mass obscured or replacing gall bladder (1/12, 8.3%). Bile duct dilatation and liver metastases were also seen. (Table II)

The CT patterns are illustrated in table III. The most common appearance was polypoid mass with abnormal enhancement (9/12, 75 %). One patient had liver abscess accompanying with polypoid mass in gall bladder lumen. Liver invasion, lymphadenopathy, invasion of hepatic flexure colon, gastric antrum and duodenum were also observed.

The MRI in one patient revealed an irregular margin, lobulated mass, about 6x7 cm in diameter with low signal intensity on T1WI and high signal intensity on T2WI and minimal gadolinium enhancement. This mass confined to the gall bladder fossa and could not separate this mass from segment 4,5 of liver. No intra- or extrahepatic bile duct dilatation was observed. The CT performed 4 months later showed increased in the size of this mass(from 6 cm to 10 cm), with invasion deeper to segment 4,5,8 of liver and irregular peripheral enhancement. There was bowel mass (with evidence of air density at the central of lesion) attached to this mass. The gall bladder could not be identified on either CT and MRI in this patient. The final diagnosis after laparotomy was carcinoma of gall bladder invading in liver, stomach and hepatic flexure of colon.

The histologic diagnoses were adenocarcinoma 67%, papillary carcinoma 23.8%, papillotubular adenocarcinoma 4.76% and mixed adenocarcinoma and squamous cell carcinoma 4.76%.

TABLE II Ultrasound findings

US findings	Number of patients (n = 12)	Percentage
Polypoid mass	10	83.3
Focal wall thickening	4	33.3
Mass obscuring or replacing gall bladder	1	8.3
Diffuse wall thickening	1	8.3
Gallstones	5	41.6
Hydrops gall bladder	1	8.3
Sludge	1	8.3
Liver metastasis	1	8.3
IHD dilatation	1	8.3
CBD stones	1	8.3
CBD dilatations	1	8.3

TABLE III CT finding

CT findings	**Number of patients (n =12)**	**Percentage**
Polypoid mass with abnormal enhancement	9	75
Focal wall thickening	3	25
Mass replacing or obscuring gall bladder	3	25
Diffuse wall thickening	1	8.3
Gallstones	2	16.6
Pericholecystic fluid	1	8.3
Liver invasion	3	25
Liver abscess	1	8.3
IHD dilatation	3	25
CBD dilatation	2	16.6
Abnormal lesion at hepatic flexure colon	1	8.3
Mass in pyloric antrum	1	8.3
Lymphadenopathy	4	33.3

Fig 1 **Adenocarcinoma :** US of female 66 years old showed a large irregular hyperechoic polypoid mass (arrow) in the gall bladder lumen.

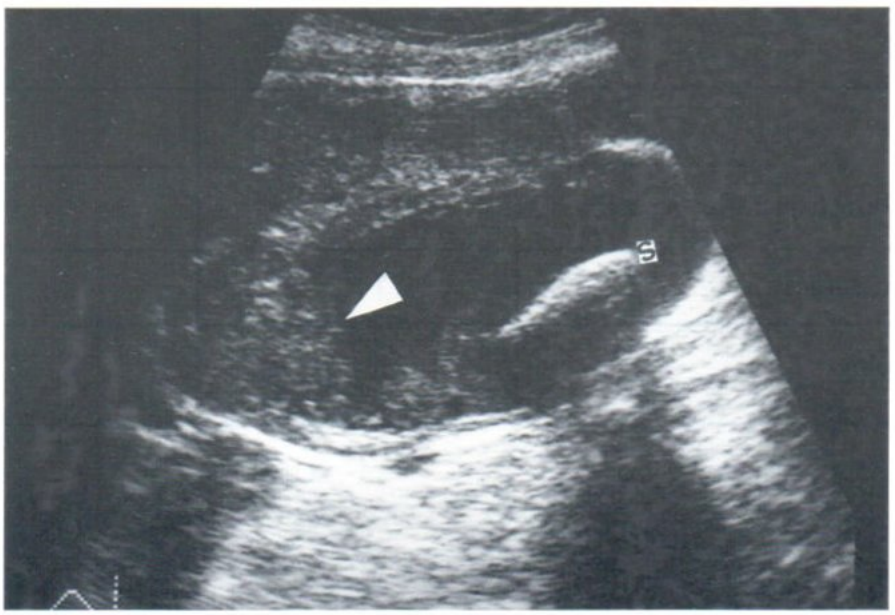


Fig 2 **Papillary adenocarcinoma :** Longitudinal sonogram of female 71 years old showed iregular echoic polypoid mass(arrow)at the body and fundus of gall bladder with gallstone (S). Accompanying cholecystitis was found.

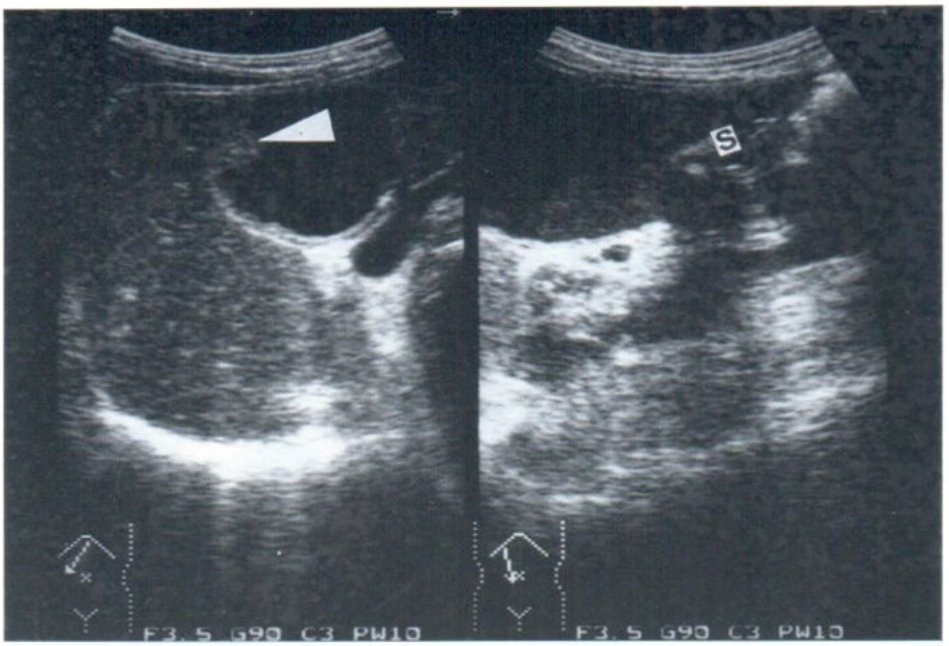


Fig 3 **Papillary adenocarcinoma :** Longitudinal sonogram of female 72 years old showed small hyperechoic mass (arrow) in gall bladder wall with small gallstone(S).

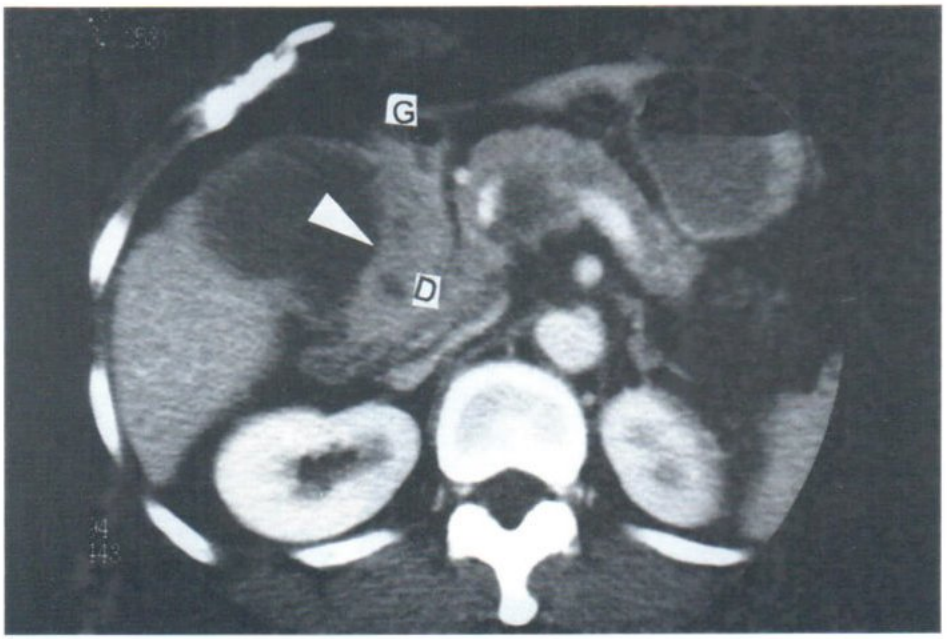


Fig 4 **Papillo-tubular adenocarcinoma :** CT scan upper abdomen post contrast enhancement of female 57 years old showed enhancing polypoid mass with focal gall bladder wall thickening (arrow). Invasions of the mass to gastric antrum (G) and duodenum (D) were observed by obliteration of the fat plane between them.

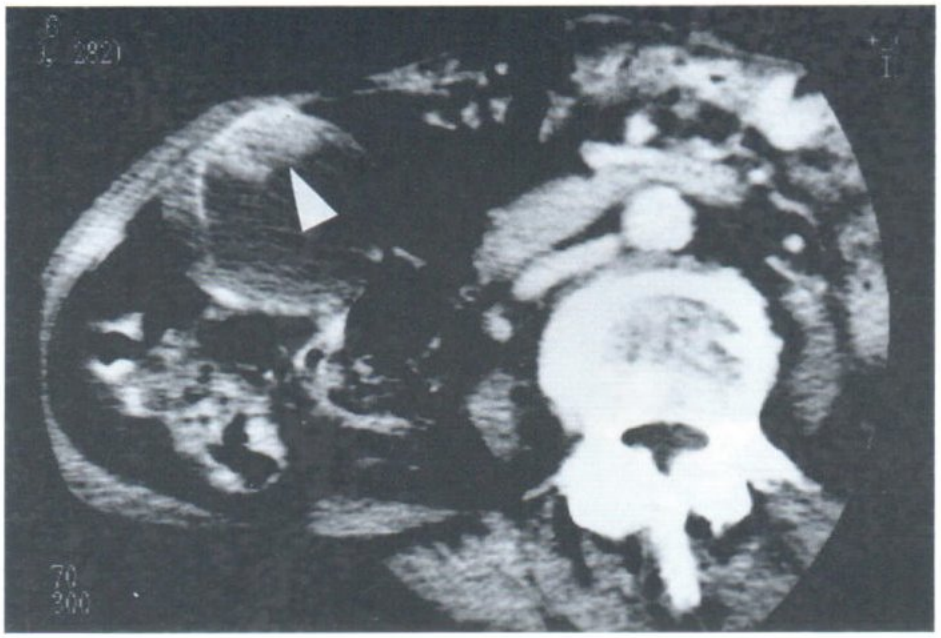


Fig 5 **Papillary adenocarcinoma :** CT post contrast enhancement of female 60 years old showed a small inhomogeneously enhanced polypoid mass (arrow) at the body of gall bladder.

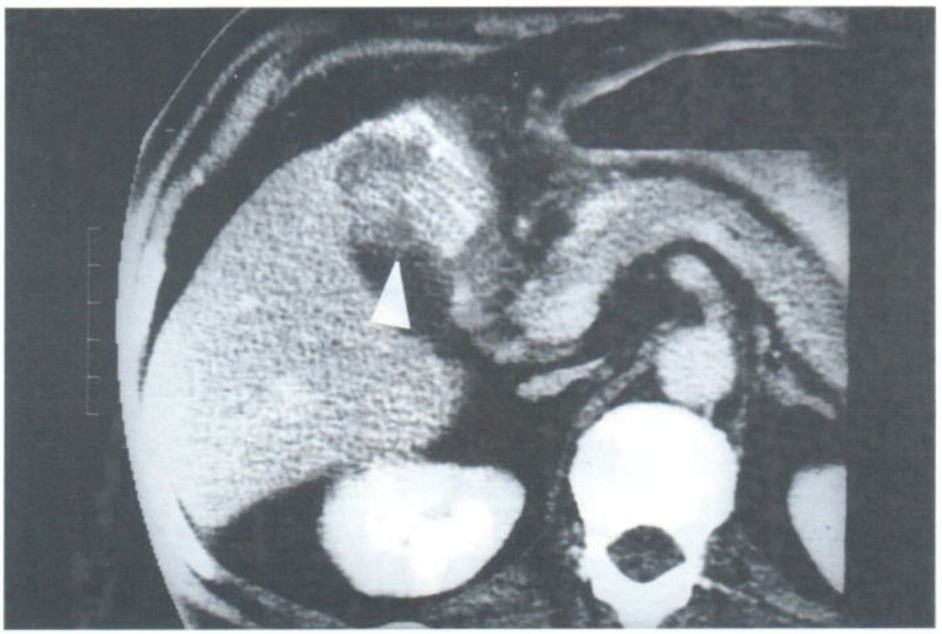
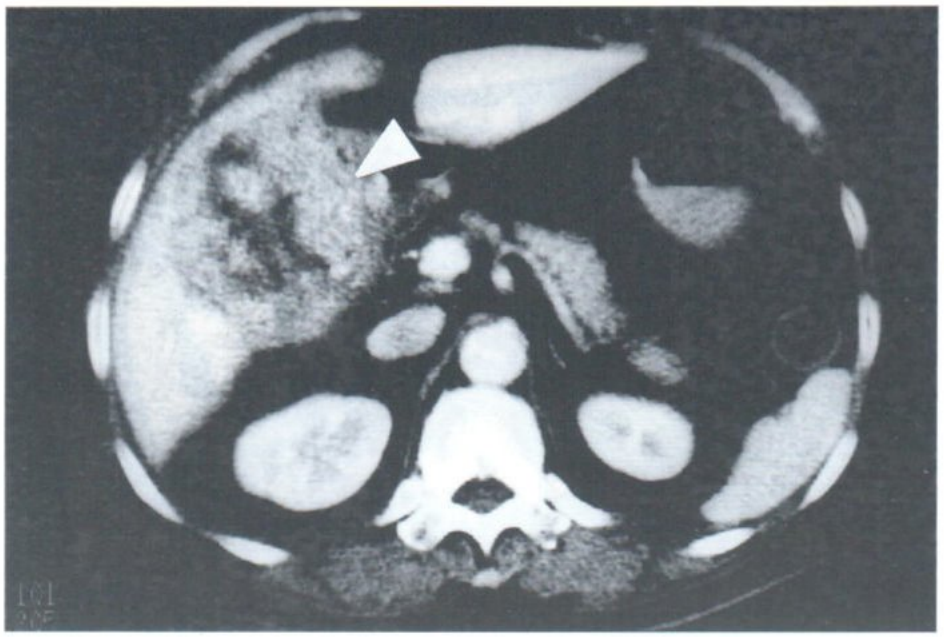


Fig 6 **Papillary adenocarcinoma :** CT scan of upper abdomen post contrast enhancement of female 71 years old showed inhomogeneous enhancing irregular polypoid mass (arrow) in the gall bladder lumen.



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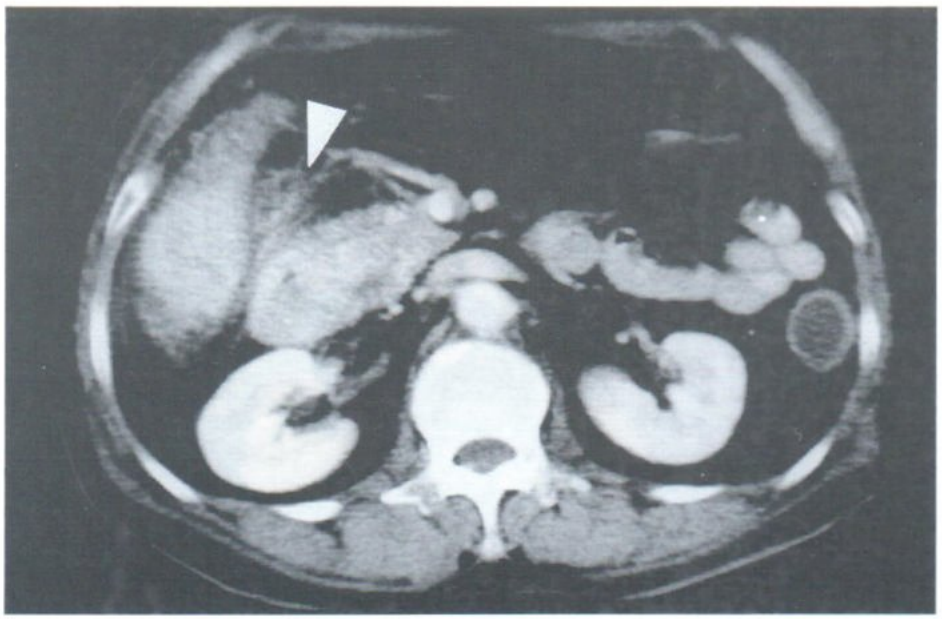
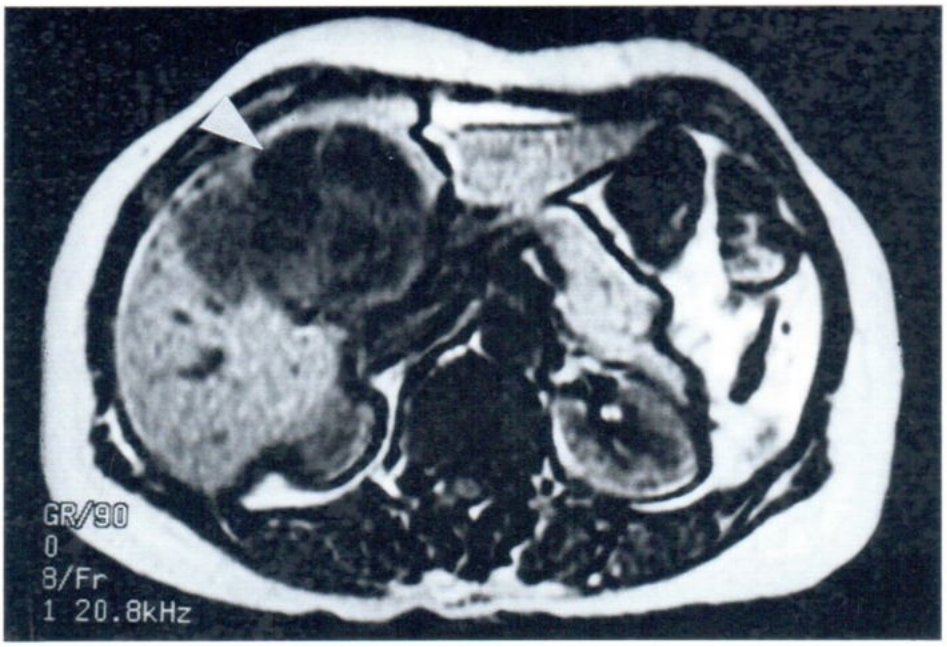


B

Fig 7 Adenocarcinoma:

A) CT scan post contrast enhancement of female 60 years old showed irregular polypoid mass with marked nodularity thickening of gall bladder wall (arrow).

B) There was inhomogeneous enhancement of hepatic flexure colon with evidence of pericolic fat stranding (arrow).
Metastasis to colon and terminal ileum with liver invasion proved by pathologic examination



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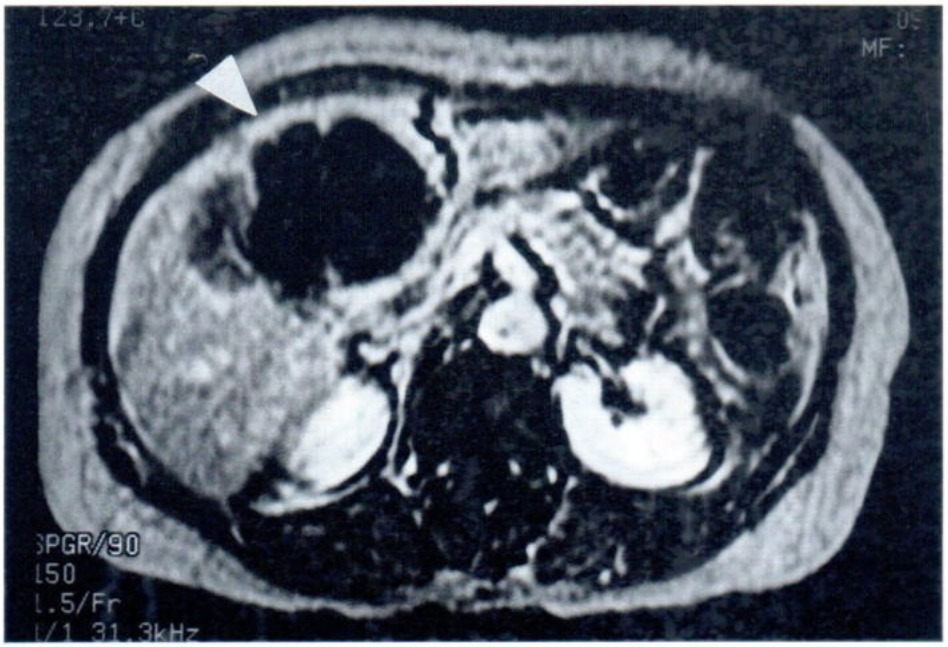
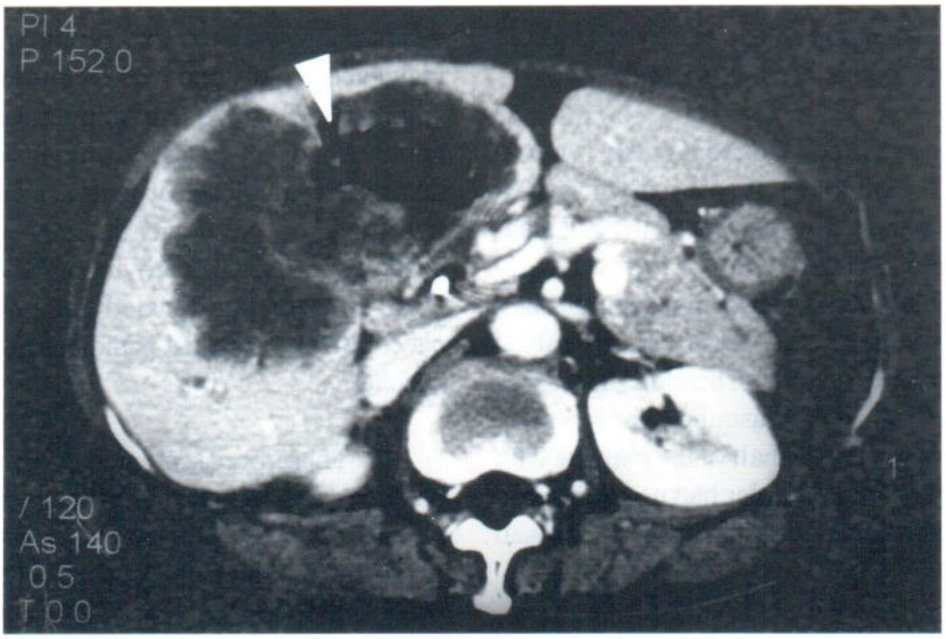


B

Fig 8 Mixed adenocarcinoma and squamous cell carcinoma of female 60 years old :

A) MRI showed a large low signal intensity lobulated mass (arrow) at gall bladder fossa in T1W image.

B) Post gadolinium enhancement showed mild peripheral enhancement.



C

Fig 8 (Continue)

C) 4 months later, CT scan post contrast enhancement showed increased in size of this mass with adjacent bowel mass (arrow). The carcinoma of gall bladder invaded to the gastric antrum was prove pathologically.

DISCUSSION

Gall bladder carcinoma is an uncommon malignant tumor of the hepatobiliary system in northeastern part of Thailand, where cholangiocarcinoma and opisthorchiassis are endemic. It comprised to 1.55% of all hepatobiliary tumor.[4] Not much attention has been paid to carcinoma of gall badder even the mortality rate is high. The overall incidence of carcinoma of the gall bladder in Thailand in general during the year 1992 to1994 was 392 recorded cases in female and 333 cases in male.[5] Eiamthong P, et al [6] reported 20 cases during the year 1996 to 1999 from Lampang province.

Sae Chau P [3] found carcinoma of gall bladder to be 1.7 % of all gall bladder disease studied pathologically.

Our analysis showed that carcinoma of gall bladder was uncommon and occurred more in female (2.5: 1) with the mean age of 64 years. It correlates well with Carriaga MT et al [7] who found the incidence 2 times higher in females than males.

The most frequent type of carcinoma of gall bladder in this study was adenocarcinoma (14/21, 67%), not different from the record in SEER (Surveillance Epidemiology and End Results) and other country.[7,8]

Gall bladder carcinoma has various imaging characteristics. The most common finding was a mass replacing or obscuring gall bladder in many studies.[9,10,11,12] But we found polypoid mass in gall bladder lumen being the most frequent finding on ultrasound images (10/12, 83.3%) and CT images (9/12, 75%). The other findings were focal or

diffuse mural thickening, gallstones, liver invasion, intrahepatic or common bile duct dilatation, etc.

The most difficult sign to identify is mural thickening. The thickness measurement is best appreciated on sonography. Normally, the gall bladder wall thickness is 3 mm, or less. However, early carcinoma of gallbladder, which confined to gall bladder mucosa may present as flat or slightly raised lesion with mucosal irregularity. Therefore, this makes it difficult to be detect by ultrasound. The report by Yoshiaki et al[13] showed that half of the patients with early carcinoma of gall bladder had no protruding lesion and less than one-third were diagnosed preoperatively.

Gall bladder wall thickening is a non-specific finding, can also be seen in acute or chronic cholecystitis, heperalimentation, portal hypertension, adenomyomatosis, inadequate gall bladder distention, hypoalbuminemia, hepatitis, hepatic or cardiac or renal failure.[8] We found focal or asymmetrical gall bladder wall 33.3% on US and 25% on CT, thus the evidence of mural irregularity or asymmetrical thickening should raise the suspicion of malignancy or complicated cholecystitis. [9] The focal gall bladder wall thickening is more specific than diffuse wall thickening. Gall bladder wall thickness exceeding 1 cm[14] or 0.5 cm[15,16] was considered to suggest carcinoma of gall bladder.

Regarding CT evaluation, the evidence of high-density polypoid mass on non-enhanced CT suggests malignancy more than benign mass.[17] Polypoid mass larger than 2 cm, in diameter also suggests malignant mass.[18] Many authors [1,9,10,18] had described association between gallstones and gall bladder carcinoma. Ward EM et al [9] found gallstones in 75% of gall bladder carcinoma in their series. The stones cause chronic irritation and inflammation of gall bladder, leading to mucosal dysplasia and subsequent carcinoma. [19] But we found gallstones in only 41.6% from US and only 16.6% from CT imaging. Although there is high incidence of opisthorchis viverrini infestation in northeastern Thailand, but the incidence of gallstones is very low in this part of the country, 2.9% in general population (Mairiang E, unpublished data), and 5% among infected individuals.[20] The incidence of acute acalculous cholecystitis was also much higher than acute calculus cholecystitis in Khon Kaen province (70 % & 30%).[3] Sae Chau P [3] found associated gallstones in 6 of 18 patients (33.3%) studied pathologically in Khon Kaen hospital.

Therefore associated cholelithiasis in gall bladder carcinoma is much higher than the general population and the opisthorchis infected people who resided in the same part of the country. Gallstones should indeed be one of risk factors of this malignant disease.

It has also been suggested that various factors associated with increasing risk of gall bladder carcinoma include large gallstone, long duration of harbored stones, ethnic difference, calcification of gall bladder wall (porcelain gall bladder), anomalies of confluence of pancreatic and bile ducts. Porcelain gall bladder associates with carcinoma was found in about 22%, and was considered a premalignant condition.[18]

As for the diagnostic tools, it has been reported that, the accuracy of ultrasound was 80%, and 60% for CT imaging.[21] The pitfall of ultrasound is the tumor that localized at the fundus because this area is the blind spot for this study.[22] The other pitfall is that gallstone can obscure the polypoid mass or focal wall thickening.

Gall bladder carcinoma spreads beyond the wall by several routes :1) direct invasion to liver, hepatoduodenal ligament, duodenum, and colon; 2) lymphatic spread to regional lymph nodes ;3) hematogenous spread to the liver; 4) intraductal extension of tumor; 5) metastasis to the peritoneum. Distant metastases are unusual.[9] CT is superior to ltrasound for evaluating the extension and staging of

disease. Bach AM, et al [23] found that in cases of gall bladder carcinoma, sonography identified 67% of liver metastasis, 79% of bile duct involvement, 67% of portal venous invasion, 36% of lymph node metastasis, 85% of mass in gall bladder. Our study, when correlates the imagings to surgical findings, we found CT superior to ultrasound for detecting lymphadenopathy, liver metastasis, mass invading gastric antrum, and hepatic flexure. Thus, sonography is reliable for depicting gall bladder mass or local extension but can not accurately reflect the full extent of disease. Sonography is particularly limited in the diagnosis of metastasis to peritoneum and lymph nodes.

One of our patients had liver abscess, this is one of atypical finding and unusual association according to Haribhaki SP, et al.[24]

The disadvantage of our study was it being a retrospective study and the number of patients was small, especially only one patient underwent MR imaging, so it did not represent the true nature or clue finding of the disease.

The advantage of our study was all cases had pathological proved. This is one of the papers, which try to seek the characteristic of carcinoma of gall bladder. However it is only a pilot project. Further prospective study is needed.

From all images, if we can not find the gall bladder, but the study illustrates abnormal mass in the vicinity of gall bladder fossa, we should consider gall bladder disease in origin. If there is focal or asymmetrical wall thickening with or without gallstones, a diagnosis of carcinoma of gall bladder should be raised.

CONCLUSION

The most common imaging finding of carcinoma of gall bladder in this study, no matter from ultrasound or CT diagnosis, was polypoid mass in gall bladder lumen. The findings of asymmetrical / focal gall bladder wall thickening, or mass obscuring or replacing gall bladder, with or without gallstones, should arouse the suspicion, as it could be carcinoma of gall bladder. The ultrasound is useful for the diagnosis of local invasion while CT is for diagnosing extension and staging of the disease.

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SONOGRAPHIC DIAGNOSIS OF BUCKLING OF THE NECK VESSELS

Wannee OJARUSPORN, MD., Chusak SIRIVANICHAI, MD.

ABSTRACT

The clinical differentiation of pulsatile supraclavicular mass is difficult. It could be aneurysm, buckling, and transmitted pulsation due to neck masses. Aneurysm is the most common impression, and angiography is usually requested. We report 14 cases of buckling of the great vessels of the neck as the cause of right supraclavicular pulsatile mass. All can be diagnosed with realtime sonography, a noninvasive and accurate method.

INTRODUCTION

Abnormalities of the aorta, aortic arch and innominate artery such as aneurysm, buckling or congenital anomalies can cause pseudo-tumors of the mediastinum,[1,2] pseudo-tumors of the apical lung [3,4] and supraclavicular mass.[2,5] The differential diagnosis of pulsatile supraclavicular mass are buckling, aneurysm, and transmitted pulse of neck masses. It is common for these patients to be referred for angiographic evaluation because of the diagnosis of aneurysm. In our report, we present the clinical and sonographic features in 14 patients with pulsatile neck masses due to buckling of the neck vessels.

MATERIALS AND METHODS

All patients were examined in the supine position with the neck extended. Using a realtime scanner, both sagittal and transverse sonograms of the pulsatile neck mass on physical examination were obtained. The course, shape, size, and location of innominate, subclavian and common carotid arteries were correlated with the location of the mass.

RESULTS

In a 10-year period, 14 patients were sent for US examination because of right supraclavicular pulsatile mass. Of the 14 patients, all but one were diagnosed as common carotid artery aneurysm, only the last patient that the provisional diagnosis is buckled artery. All were women: they were 48 - 81 years old (mean, 59.75). Eleven patients had longstanding hypertension and 3 were normotensive.

The buckled arteries had a characteristic inverted U-shaped course. The bend in the vessel was very superficial under the skin and corresponded to the supraclavicular pulsatile mass. The pulsatile neck masses corresponded to buckling of the distal innominate artery (Fig. 1) in ten patients and buckling of the proximal right common carotid artery (Fig. 2) in four cases.

Angiography was performed in the first 2 cases and confirmed the sonographic findings. Due to the characteristic appearance of the buckled vessels on sonography, angiography was not done later on.

US = ULTRASOUND

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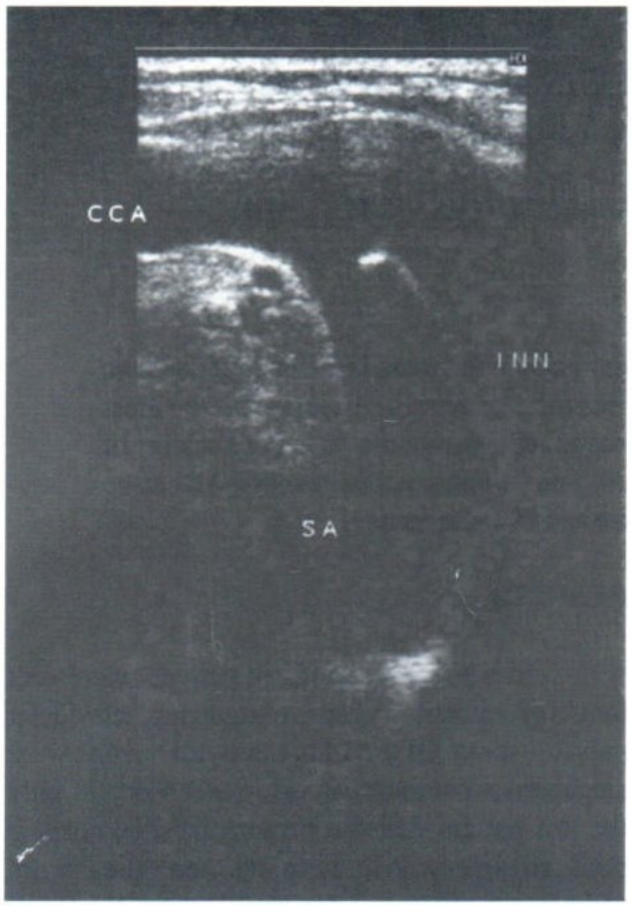

Fig. 1 Right parasagittal sonogram reveals high and superficial position of the buckling innominate artery (INN) corresponding to the supraclavicular pulsatile mass. CCA= common carotid artery, SA= subclavian artery

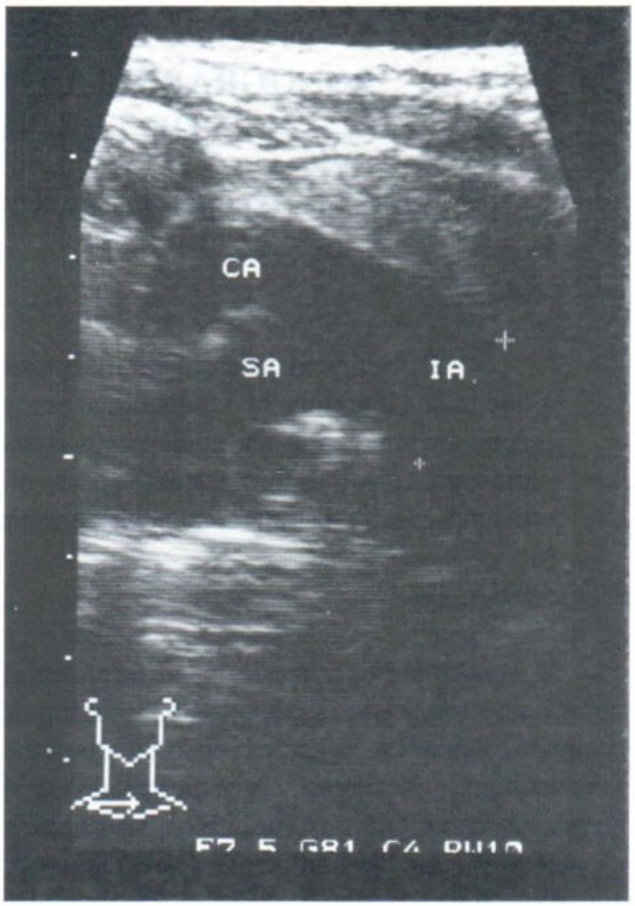

Fig. 2 Transverse sonogram of right supraclavicular fossa demonstrates buckled common carotid artery (CA). IA = innominate artery, SA= subclavian artery

DISCUSSION

The normal innominate artery is the first and largest branch of the aorta. It originates from the right side of the aortic arch, runs upward to the right, and bifurcates at the level of the right sternoclavicular junction into the right common carotid and right subclavian arteries. As a result of hypertension and arteriosclerosis, the aorta and innominate artery elongate simultaneously. Aortic elongation elevates the origin of the innominate artery toward the neck. The innominate and common carotid arteries are forced to buckle. The degree of buckling is determined by the length of the artery relative to the space available.

Buckling of the innominate and right common carotid arteries is generally seen in patients over the age of 50 years, and in hypertensive patients.[2,3,6] In most reported series, buckling was more common in women. Clinically, buckled innominate and common carotid arteries present as pulsatile masses, indistinguishable from an aneurysm on physical examination, and the recognition of buckling is clinically significant since their nature is benign.[7-9]

In our experience, buckled artery is not a rare condition and is the sole cause of 14 right

supraclavicular pulsatile masses. Sonography is an effective initial procedure in diagnosing buckled artery and obviates unnecessary angiographic study.

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PREVALENCE AND RISK FACTORS OF OSTEOPOROSIS AMONG THAI MALE PATIENTS AT GERIATRIC CLINIC, KING CHULALONGKORN MEMORIAL HOSPITAL

Kanaungnit KINGPETCH M.D. [1]

OBJECTIVE To study the prevalence and determine risk factors of osteoporosis in elderly Thai men.

STUDY DESIGN Prospective ,descriptive study.

STUDY METHOD Forty healthy Thai men 60 years and older who do not take any medication that effect bone mass were recruited in this study . These volunteers were asked to answer questionaire about risk factors causing low bone mass . Bone mineral density of the lumbar spines and non-dominant proximal hip were measured by Dual Energy X-ray Absorptiometer.

RESULTS According to WHO diagnostic criteria ,the prevalence of osteoporosis of lumbar spines and femoral neck was 37.5 percent and 12.5 percent respectively by using cutoff value from the American 's cutoff value and was 35 percent and 52.5 percent respectively when using Thai's cutoff value.None of risk factors correlated with osteoporosis.

CONCLUSION In Thailand ,up until the time of this report, there are no reliable data concerning prevalence of osteoporosis in men.The results of this study,initiate the emerging recognition of the impact of osteoporosis in Thai men.Further study in large population is encouraged to determine the actual prevalence and risk factors of osteoporosis in Thai men .Role of Thai health government in the prevention of osteoporosis in men is essentials because osteoporosis may be a huge problem in the future due to change in Thai life style and longer life time expectancy.

KEY WORD : Bone mineral density ,BMD ,osteoporosis , Thai men ,DEXA,prevalence ,risk factor

Although it has been generally accepted that osteoporosis is common in women,only recent studies reported that it is also widespread in men.[1-3] It is now recognized that one in twelve men in Western countries have osteoporosis .Thirty percent of all hip fractures occurred in men and the burden accounts for at least one quarter of the total £1 billion was spent for osteoporosis by the National Health Service in the United Kingdom.[4] In the United States, the incidence of hip fracture in men older than 65 years is 4-5/1000 and in similar aged women is 8-10 /1000.[5]

In Europe, the death rate of femoral fracture neck in elderly men is approximately equal to women, therefore morbidity and mortality after osteoporotic fractures appear to be serious in men the same as in

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women.[6]

Bone mineral density (BMD) is the most easily measured and accurate predictor of fracture risks.For any individual ,BMD is the combination of bone formation and subsequent bone loss,both of which are influenced by genetic,hormonal and environmental factors.[7]

The objective of this preliminary study was to assess the prevalence of osteoporosis in Thai men, age 60 years and older, by measurement of bone mineral density and determine clinical and risk factors of osteoporosis. The risk factors assessment may be useful in places where bone densitometer are not available.

MATERIALS AND METHODS

Forty Thai men were recruited for the study.The inclusion and exclusion criteria for selection of studied subjects were as follows.

Inclusion criteria

1. Thai men age 60 years and older who were born and live in Thailand at least 20 years.

Exclusion criteria

1. History of prolonged bed rest (over 4 weeks)
2. History of calcium,vitamin D supplement
3. History of sex hormone replacement therapy
4. History of medications that may affect bone density such as steroid, thyroxine
5. Presence of chronic illness including thyroid disease and hyperparathyroidism
6. History of X-ray contrast media administration or radionuclide study one week prior to present study

All subjects were asked to answer the questionnaire concerning risk factors of bone loss. Bone mass was measured in each subjects utilizing dual energy X-ray absorptiometer (Hologic Delphi). Long term precision of the equipment is about 1%. The measurement included anterior lumbar spines (L1-L4) and non-dominant proximal hip.Results were expressed in grams of ashed bone per unit area of scanned bone(gram per square centimeter, g/cm^2).

According to WHO criteria ,osteoporosis is diagnosed when the value of the BMD is more than 2.5 standard deviation below the young adult mean and osteopenia is diagnosed when the value of BMD is between 1.0 standard deviation to 2.5 standard deviation below the mean.[8] In this study ,we compared the prevalence of osteoporosis and osteopenia using two different cutoff values.The first cutoff value is from the bone mineral density databases for American men.[9] The second cutoff value is from the bone mineral density database for Thai men . The mean of peak bone mass of Thai men at lumbar spines and femoral neck is 1.030 ± 0.081 g/cm^2 and 0.973 ± 0.097 g/cm^2 respectively.[10]

Descriptive statistics were used when it was appropriated to compare qualitative data, chi-square. P–valued of less than 0.05 is considered statistically significant.

This study protocol was approved by Ethics Committee of the Faculty of Medicine,Chulalongkorn University,Bangkok,Thailand.

RESULTS

Forty men were enrolled to the study. The mean ages of subjects was 68.85 years with the age ranges of the studied population was 60-80 year old.The mean BMI of subjects was 24.19 kg/m^2 (range between 18-32 kg/m^2)

The proportion of osteoporosis and osteopenia of the studied men were shown in Table1. The study revealed 37.5 and 12.5 percent had osteoporosis at lumbar spines and femoral neck respectively by using American's cutoff value.Thirty

five and 52.5 percent had osteoporosis at lumbar spines and femoral neck respectively by using Thai's cutoff value (Table 2). Therefore the prevalence of osteoporosis of lumbar spines by using Thai's and American's cutoff values were similarly. But prevalence of osteoporosis of femoral neck by using Thai 's cutoff value was more much than using American's cutoff value.

TABLE 1. Bone mineral density of lumbar spines and femoral neck in elderly Thai men (n= 40) using American's cutoff value

	BMD					
Measurement sites	Normal		Osteopenia		Osteoporosis	
	No	%	No.	%	No.	%
1. Anterior lumbar spines (L1-L4)	15	37.5	10	25	15	37.5
2. Femoral neck	12	30	23	57.5	5	12.5

TABLE 2. Bone mineral density of lumbar spines and femoral neck in elderly Thai men (n= 40) using ***Thai' s cutoff value***

	BMD					
Measurement sites	Normal		Osteopenia		Osteoporosis	
	No.	%	No.	%	No.	%
1. Anterior lumbar spines (L1-L4)	15	37.5	11	27.5	14	35
2. Femoral neck	4	10	15	37.5	21	52.5

When compared the factors associated with osteoporosis to studied men. Osteoporosis in this study did not show correlation with history of insufficient calcium intake ,alcohol consumption , tobacco smoking , non-exercise and low body mass index (BMI) .

DISCUSSION

A large study which conducted in the US,the Third National Health and Nutrition Examination Survey (NHANES III),estimated that 1-4% of men have osteoporosis and 15-33% have osteopenia

based on World Health Organization criteria for BMD measurement at the femoral neck level.[11]

Our study ,the results revealed lower prevalence of osteoporosis of femoral neck when using American's cut off value than Thai's cut off value.But similarly prevalence of osteoporosis and osteopenia of lumbar spines when using Thai's and American's cutoff value.

Using American's cutoff value and Thai 's cutoff value ,the prevalence of osteoporosis of lumbar spines and femoral neck in this preliminary study was high. The result of this study emerging recognition of the impact of osteoporosis in Thai men.

At present ,screening of osteoporosis by BMD can not be justified and facilities for bone densitometer remain restricted to few centers.Another possible approach to early detection of osteoporosis is the use of clinical and historical risk factors to predict bone mass.

Tobacco was linked to an increased prevalence of vertebral fractures in men in cohort studies of Seeman and Melton in which the relative risk of vertebral fracture in smokers was 2.3.[12] Prolonged abuse of alcohol is also deterimental to skeletal integrity in men has only recently been recognized. [13-15] Recent studies suggested that ethanol also exerts toxic effects directly at the cellular level in bone.Ethanol induces a dose-dependent reduction in cellular protein and DNA synthesis in human osteoblast in vitro.[16] Further evidence implicating a direct effect of ethanol on osteoblast activity comes from studies examining circulating bone Gla protein (BGP, osteocalcin) level in alcoholic subjects.BGP is a small peptide synthesized by active osteoblasts ,a portion of which is released into the circulation.The consumption of 50 gm.ethanol (equivalent to four " shots" of scotch whiskey) over 45 min. results in a 30% decrease in serum BGP concentration that is detectable 2 hr. later.[17]

Several reports have also linked dietary calcium intake to levels of bone density in men,but the evidence is not yet conclusive.In a study of 222 subjects ,Kroger and Laitinen found men in the highest tertile of calcium intake (> 1200 mg/day) have higher proximal femoral BMD (but not spinal BMD) than those in the lowest tertile (< 800 mg/day).[18] However ,two other very large studies found no relation between calcium intake and hip fracture risk in men.[19-20] In general ,these evaluations of the relationship between calcium intake and hip fracture in men are suggestive of a beneficial effect but remain inconclusive.

In cross-sectional studies ,bone mass is greater in physically active men an effects that can be demonstrated at lumbar spine and femoral neck.[21-22] Finally, exercise has been strongly related to a reduction in hip fracture rates in men ,an effect that may also relate to a reduced risk of falls.[20,23] As in women, body weight itself is highly correlated with bone density in men.[24]

In this pilot study ,no any risk factors is associated to low bone mass due to small number of subjects.In conclusion,in Thailand up until the time of this report, there has no reliable data concerning prevalence of osteoporosis in men.The results of this study emerging recognition of the impact of osteoporosis in Thai men.Further study in large population is encoraged to determine actual prevalence and risk factors of osteoporosis in Thai men. Role of Thai health government in the prevention of osteoporosis is essentials because osteoporosis may be a huge problem in the future due to change in Thai life style and longer life time expectancy.

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PATTERN OF METASTATIC DEPOSIT IN BONES

Dr Md Reajul ISLAM, Dr Md Murshed ALI, Dr M A TAHER.

ABSTRACT

To detect the pattern of bony involvement of various malignant diseases by planar bone scanning.

Methods : 99m Tc-MDP was injected four and three phases bone scan performed in some circumstances. After 2 hrs static acquisition done. After four injection, sequential images were taken for 30 seconds, blood pool images at 1 minute, static views were taken after 2 hours. Diagnosis was made in all cases histologically.

Results : In the years of 1999-2000, only 76 patients, where as in the year of 2001-2002, 236 patients were referred to NMC, Rangpur for bone scan to detect metastatic deposition in bones. Among these (236), 81 patients with Ca (Ca-Carcinoma) breast, metastatic deposit found in 31 patients (38.27%), metastatic deposit found in Ca prostate patients 66.66%, in Ca-lung, secondaries found in bone 58.33%, metastatic deposit in renal Ca 60% and in Urinary Bladder malignancy 33.33%. In Hodgkin's lymphoma (HL) and Non-Hodgkin's lymphoma (NHL) bony metastasis found 33.33% and 40% respectively. Clinically most of the referred patients were of suspected bone metastasis.

Conclusion : Accurate bone scan diagnosis depends on high quality image. Specific advantages of SPECT in identifying and localizing skeleal pathology have already been established. But planar scintigraphy in diagnostic application for skeletal oncology not laagging behind. SPECT supplements but does not replace planar bone scanning.However, programme should be taken to aware the referring physician to detect bony involvement earlier by isotope scan than radiograph which will help to palliate or, cure the patients.

Key words = Bone, Metastasis, MDP.

INTRODUCTION

Cancer incidence and death rates continue to fall in the USA;[1] but day to day malignancy of various human organs are increasing in many other parts of the world. Cancer is a multistage disease, not a single event and doctors should emphasize cancer prevention in addition to cancer treatment and cure. Chemoprevention with naturally occuring (many dietary) and synthetic agents shows promise for preventing, arresting and reversing cancer development.[2] Most human cancers are caused by genotoxic carcinogens. However, we should search for the causes of

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malignancies. Also search for how to control the malignant diseases, which will minimize the incidence of malignancy. For example to prevent Ca. stomach we should take more vegetables, fruits, vit. C, vit. E. Less intake of salt, alcohol, tobacco etc. Red wine is also a factor in the causation of Ca. stomach.

Excess egg ingestion is a risk factor for Ca. rectum, colon. Radiation can cause malignancy anywhere in the body. Vit-D3 can prevent invasive breast cancer. Oral contraceptive inceases the incidence of Ca. cervix. In USA, diuretics play an important role in the incidence of renal cell cancer among female. Geographical distribution, occupational and nutritinal factors are also some important causes for malignancy.

Malignancy is the first cause of death (35-45%) in the developed and developing countries. Bone scan is currently accepted as a powerful investigational tool in the evaluation of patients with both benign and malignant skeletal disease. The commonest indication being the detection of occult metastasis, for which purpose the entire skeleton should be imaged. Bone scintigraphy is directed towards identifying sites of skeletal metabolism and abnormal foci of calcium phosphate deposition.

INDICATIONS FOR BONE SCANNING

1. Identification of bone pain of unknown origin.
2. Screening of patients with suspected malignancy.
3. Pre-operative staging for Ca. breast, Ca. bronchus and Ca. prostate.
4. Planning of radiotherapy.
5. Selection of sites for bone biopsy.
6. Detection and follow-up of primary bone disease.
7. Early identification of soft tissue lung mets from primary bone tumour.
8. Assessment of trauma to the skeleton.
9. Differential diagnosis of compression fracture in the spine.
10. Localization of inflammatory bone disease.
11. Localization of sites of Paget's involvement.
12. Detection of soft tissur calcification.

The 99m-Tc labled phosphate are believed to undergo chemisorption-tracer adsorbed on to the surface of calcium hydroxy-apative crystal and then passes in to the interior of the bone crystal.[3] Deposition of tracer occur in the areas of new bone formation of any aetiology. Tracer deposition also depends on blood flow to a given area not to the bone mass. Bone scan quality depend on state of hydration, renal function, obesity, distance of detector from patient, quality of radiopharmaceutical, age of patient, scan interval, any systemic therapy like chemotherapy, steroids etc. The characteristic appearances of metastasis on the bone scan is thus a hot spot. In extensive metastasis, the bone scan may resemble the superscan appearance of metabolic bone disease.

AIM & OBJECTIVE

Role of scintillation gamma camera in the diagnosis of bone metastasis. Also to find out the causes and how to control malignant diseases.

MATERIALS & METHODS

Scintillation gamma camera (Siemens, made in Gemany). bone kits (Amersham-MDP; Mallinckrodt-HDP), isotope 99m-Tc-combinedly allow clear visualization of the skeletion and to produce the bone scan that we are familiar with today. Immediately afer IV bolus injection of radionuclide, 15 mCi 99mTc-MDP scintiphotos were obtained, 2 sec interval for 30 sec to see the regional blood flow followedby static images at 1 min to see the blood pool phase. Delayed imaging at 2 hrs. post-injection reflects osseous activity. Static images were taken both in supine and prone position of the major body regions. All

patients were well hydrated prior to isotope bone scan in order to enhance the excretion of tracer from soft tissue and vessel via the urinary tract. Patient Urinary Bladder was made empty before scanning to make a good scan of pelvic bones also to reduce the radiation dose to the bladder.

RESULT

In this study 236 cases have been included, among these 76 (32.20%) patients found with positive bone scan. Histologically almost all cases were malignant. Age range were 0.5 to 80 years. Sex ratio between male and female 1:1.31. Total male and female patients in different age groups shown in Table 1 The percentage of bone metastasis of various malignant diseases shown in Table 2. In Ca. cervix, bone metastasis found in 66.66% and in Hodgkin's lymphoma (HL) 33%. These results are a bit higher than usual. Probably the cases were referred to NMC, Rangpur in the late stage.

Table 1 Age-Sex distibution

Age in Years	Male	Female
0.5-15	03 patients	05 patients
16-30	13 patients	17 patients
31-45	25 patients	60 patients
46-60	32 patients	40 patients
61-75	26 patients	12 patients
Above 75	03 patients	00 patients
Total-236	102	134

Table 2 Top 10 promary malignancies with bone metastasis.

Primary sites		Mets present	Mets absent
Breast	81 cases	31 (38.27%)	50 (61.73%)
Lung	24 cases	14 (58.33%)	10 (41.67%)
Bone tumour	17 cases	08 (47.05%)	09 (52.95%)
Alimentary canal	15 cases	04 (26.66%)	11 (73.34%)
NHL	10 cases	04 (44.44%)	06 (55.56%)
Prostate	06 cases	04 (66.66%)	02 (33.34%)
Cervix	06 cases	04 (66.66%)	02 (33.34%)
HL	06 cases	02 (33.33%)	04 (66.67%)
Renal	05 cases	03 (60 %)	02 (40 %)
M.Myeloma	02 cases	02 (100 %)	00 (00 %)
Total	172	76	96

Sixteen patients out of 236 were refered for bone scan due to malignancy of various organs-e.g Ca. thyroid gland, salivary gland, testes, tongue etc, none had bone metastasis.

DISCUSSION

In our study we have ovserved the increased percentage of bone metastasis of various malignant diseases. It could be due to two reasons. One, not all patients who were suffering from malignant diseases were referred to our NMC, Rangpur. Only the suspected patients with bony metastasis were referred. Two, in the northern zone of Bangladesh, patients are not much aware about health, all patients consulted their physicians in the late stage of the malignant process. On the other hand, we didn't take 24 hrs scan for spinal metastasis. So, we may have missed few of them as false negative. Metastasis in spine take more tracer at 24 hrs. scan. In 4 hrs. scan benign and malignant lesion of spine, no significant change of tracer distribution. In our study most of the cases had multiple hot spots. because the number of lesions on a bone scan may provide some guide as to the likely cause. Around 7% of patients with metastasis will present with single lesion on the bone scan.[4] Anoher series study showed 55% of the solitary scan abnormalities were due to neoplastic disease. The remainder were due to trauma (25%), infection (10%) and miscellaneous causes (10%). The location and distribution of multiple bone scan lesions help in the determination of their natures. Linear lesion in the ribs is probaly due to trauma.[5] Elongated rib lesion is likely to be malignant, while focal rib lesion is often due to fracture.[6] We observed, in our study, the sites of metastatic deposit were found mostly in the thoracic and lumbar vertebrae, ribs. Long bones involvement were minimum. Shape of the hot spots were focal, rounded.

In case of metaststic lesion from breast and lung cancer, thoracic spine or, rib lesion are common (>80%) and limbs sites are uncommon (15%).[7] Solitary rib lesions are malignant in 1-17%, while around 80% of vertebral lesions are malignant. Isolated joint abnormalities are likely to be due to arthritis.[8]

Breast cancer is the most common cause of cancer death in women at the age range from 15-75 years of age. In this study we found metastatic deposit in bones from Ca. breast 38.27%. There are reports of Ca. breast metastasis in bones 4.4% and 7.2% in stage I, stage II respectively. This wide discrepancy may be due to bone scan was made in late stages of Ca. breast.

In more advance diseases at presentation, the pick-up rate of metastasis is high with a mean figure of 28%.[9]

We have 54% of bone metastasis in a selected Ca. lung patients. Studies on unselected patients with broncial carcinoma showed a frequency of abnormal bone scan 31%.[10] Another study showed 33% bone metastasis in Ca. lung.[11] Possibly due to bone scan done in advanced stages of Ca. lung. Levenson et al studied 119 patients with small cell carcinoma of the lung and reported that 49 patients (41%) had positive bone scan before having treatment.[12]

In our study, we have observed 60% metastatic deposit in bone from prostatic cancer, the highest incidence of metastasis at presentation, more than in breast cancer which is around 38% or more in more advanced disease.[8] Johansson et al reported that bone scanning detected skeletal metastasis in 24% of patients with prostatic carcinoma at the time of presentation.[13]

CONCLUSION

Accurate bone scan diagnosis depends on high quality immaging. Specific advantages of SPECT in identifying and localising skeletal pathology have already been established. But planar scintigraphy in diagnostic application for

Another group of patients, 28 in number, performed bone scan not due to malignant disease rather than due to some non-specific causes like PUO, H/O fall, unconciousness, generalized bodyache, thigh mass etc. One patient had bone marrow infiltration. All these patients were normal in bone scan.

PUO = Pyrexia of Unknown Origin
H/O fall = Home Outside fall

Ten patients of Ca. gall bladder were referred for bone scan, none had bone metastasis.

Six patients with Ca. overies came for bone scan, all had normal findings.

Three patients with Ca. urinary bladder but none of them had bone metastasis.

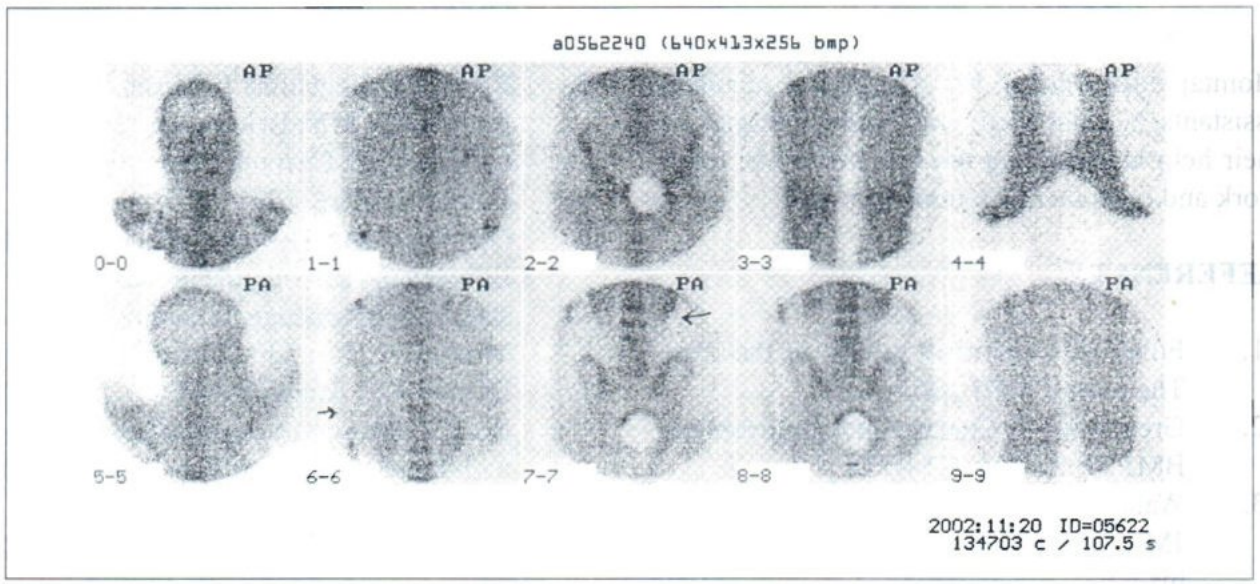

Fig. 1 Metastatic deposit in lumbar vertabrae.

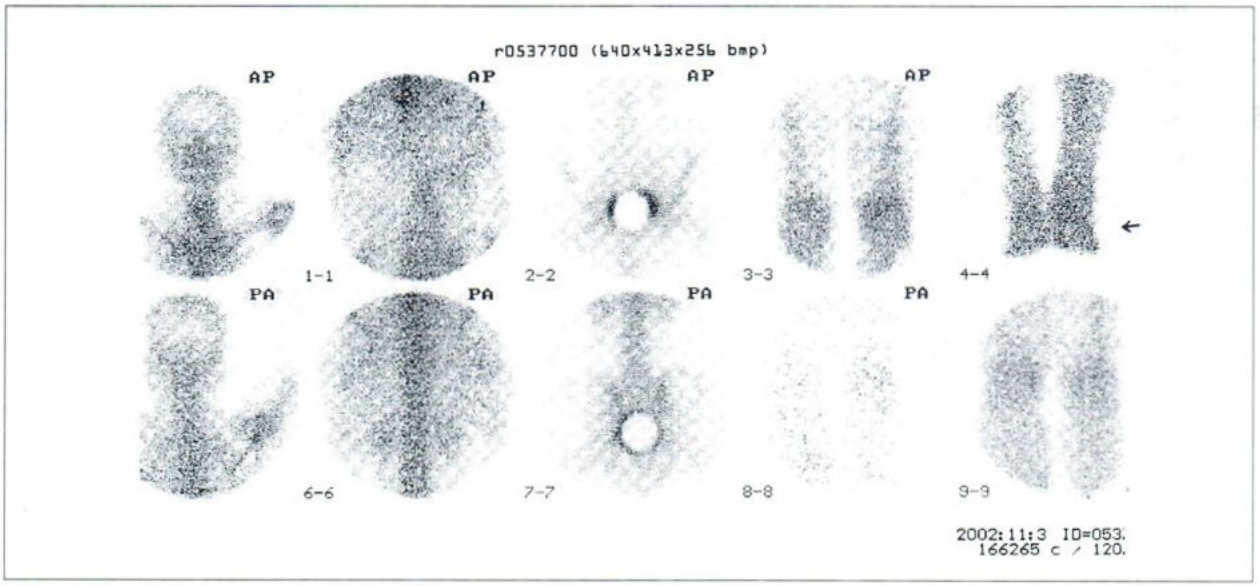

Fig. 2 Metastatic deposit in legt ankle

skeletal oncology is not lagging behind. SPECT supplements but does not replace planar bone scanning. However, programme should be taken to aware the referring physician to detect bony involvement earlier by isotopic scanning rather than by radiography alone which will help to palliate or cure the patients more effectively.

ACKNOWLEDGEMENT

We like to thank Mr Shafiqul Islam, Mr Momtajuddin Ahmed, Mr Ali Ahmed scientific assistants, Nuclear Medicine Centre, Rangpur for their help in collecting the raw materials, paper work and computer programme.

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NON-OSSEOUS UPTAKES OF TC-99M PHOSPHONATE DURING THREE PHASES BONE SCANNING

Dr. M. A. Taher, Director,

ABSTRACT

Objective : The purpose of this was to visualize non-osseous uptakes of bone scanning agent.

Methods : Amongst 51 patients (Male 21, Female 30) of age range 8-80 years having three phase bone scans at NMC, Rangpur during January 2002, we looked for non-osseous uptakes. All of these patients were encouraged to drink enough water prior to bone scans.

Results : Twenty four patients had non-osseous uptakes of 99 metastable technetium methylenediphosphonate (99m Tc MDP). Renal, pulmonary and mammary uptakes of this series are not always due to malignant process, however, one patient had cisplatin nephrotoxicity.

Conclusion : Non-osseous uptake of bone-seeking radiopharmaceutical is quite common (24/51 i.e. about 48% in this series), however, most of these may be non-malignant. (Abstract Presented in 7th National Conference of Society of Nuclear Medicine, Bangladesh on 9 March, 2002).

Key words : Bone scan, Non-osseous Uptake.

INTRODUCTION

Staging of tumours is important both for the selection of appropriate treatment and to provide information about prognosis. Inadequate or inaccurate staging may lead to under or over treatment, resulting in failure to cure or unnecessary toxicity respectively. The increased sensitivity of bone scanning provides a 6 to 18 months before X-rays in demonstrating metastatic disease.[1] Breast uptake of bone scanning agents is non-specific, it has been reported in the normal breast as well as in benign or malignant diseases of the breast.[2,3] Holmes et al. showed that 95% of benign lesions including fibroadenomas, mammary dysplasia and cystic mastitis had bilateral uptake, while 25% of malignant lesions showed a similar pattern.[4] The appearance of a dilated renal pelvis and ureter with increased tracer accumulation is the most common soft tissue anomaly on bone scanning.[5]

METHODS

Three phase bone scans were performed using 5-20 milli Curies (mCi) of 99m Tc phosphonate under a computerized gamma camera (Siemens Microdelta). Amongst 51 patients (M21, F30) of age range 8-80 years having three phase bone scans at NMC, Rangpur

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during January 2000 to January 2002, we looked for non-osseous uptakes in all phases i.e. during post-injection flow, blood pool and late static views.

RESULTS

Twenty four patients had non-osseous uptakes of 99 metastable technetium methylene-diphosphonate (99m Tc MDP), 19 in kidneys (14 in right, 4 in left kidneys, one patient showing hold-up in both kidneys), 3 in breasts (2 in left, 1 in right breast), and two patients had lung uptakes. Renal, pulmonary and mammary uptakes of this series are not always due to malignant process, however, one patient had cisplatin nephrotoxicity.

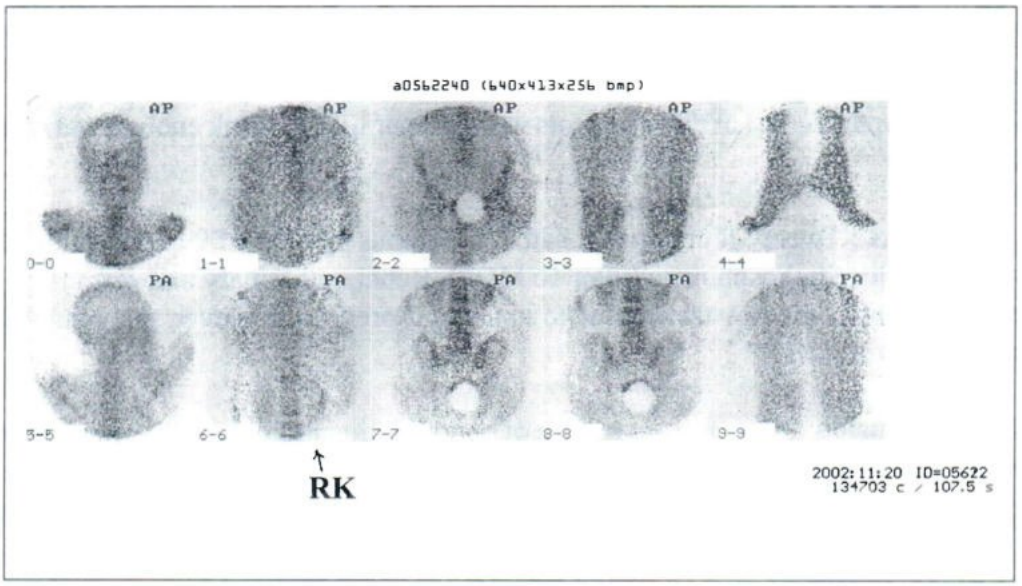

Fig. 1 Increases concentration of 99mTc MDP in Right kidney.

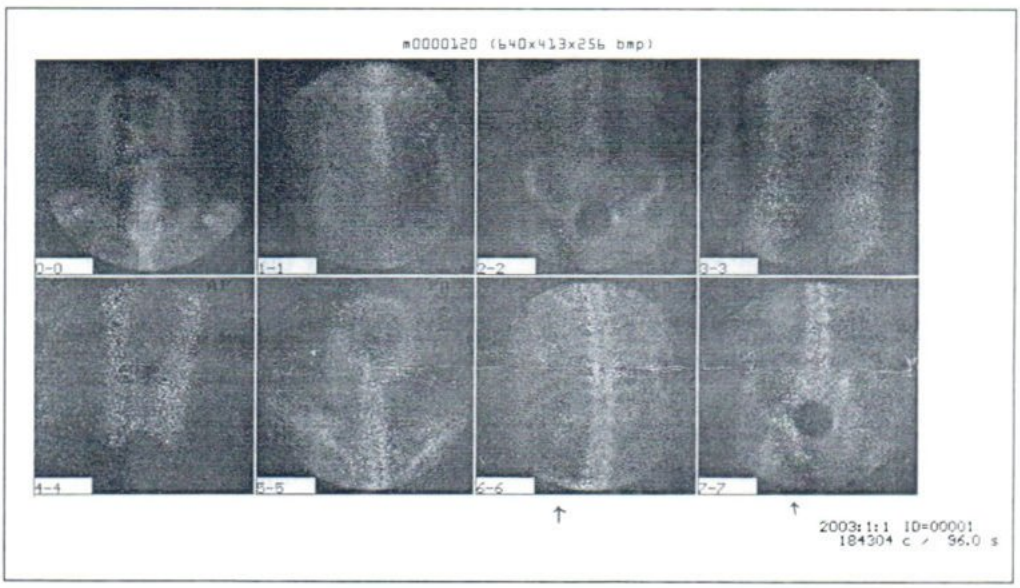

Fig. 2 Increases concentration of 99mTc MDP in Left kidney.

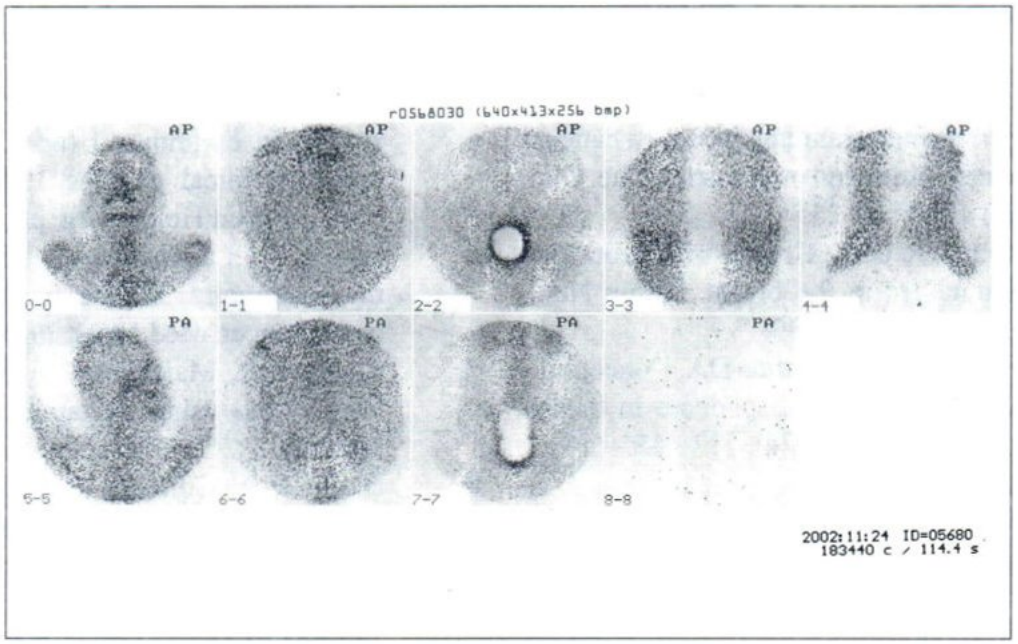

Fig. 3 Increased concentration of 99mTc MDP in Both kidneys.

DISCUSSION

Bone-seeking radiopharmaceuticals concentrate in the skeletal system as well as in many soft-tissue lesions for non-osseous pathology, sometimes serendipitious(incidental) and also purposeful detection e.g. scintimammography. However, the non-specific nature of the findings should be kept in mind. A negative mammogram should be ignored, if a suspicious breast lump remains palpable,[6] and Sestamibi scan is better than mammography.[7] Biello et al compared bone scan with IVP (intravenous pyelogram) and found that bone scan had a sensitivity of 73% with specificity of 100% for detection of uretero -pyelocaliectasis. They found that bilateral disease on bone scans were 100% concordant with IVP, while unilateral anomalies were found in 50% of cases with bilateral disease, bone scan detecting the most severely affected side. Increased accumulation in the renal pelvis alone was found to be an unreliable and insensitive(11%)indicator of true pelvi-ureteric junction (PUJ)obstruction. IVP is usually normal or reveals an extra renal pelvis or duplex calyceal system in such cases.[8] Intense renal uptake of bone agents was described 6-10 days after cytotoxic drugs, e.g. cyclophosphamide, doxorubicin, cyclosporin, vincristine and amphotericin B.[5] Uptake of bone radiopharmaceautical can result from a tumor of the chest wall, lung and pleural uptake in bronchogenic carcinoma, radiotherapy to chest and radiation pneumonitis. Metastatic disease in lung is readily identifiable by the more focal nature of the uptake.[5]

CONCLUSION

Non-osseous uptake of bone scanning agent is about 48% (24/51) in this series, however, most of these may be non-malignant and a result of cytotoxic drugs and/or radiotherapy.

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ASSESSMENT OF PERSONNEL DOSE EXPOSURE MONITORING BY TLD AT NMC, RANGPUR

AKM Mashidul Islam, Dr. M A Taher

ABSTRACT

We investigated the whole body dose exposure monitoring on scientific personnel of Rangpur Nuclear Medicine Centre for the period of 01-12-2000 to 30-06-2002 due to gamma and beta rediation.

Methods : Distributed the Thermoluminescent Dosimeter badge among the 17 scientific personnel at Nuclear Medicine Centre, Rangpur and every after three months supplied by the health physics division of Bangladesh Atomic Energy Commission, Dhaka. The TLD badges are sent to the health physics division of BAEC, Dhaka for examinations. In this way six time TLD badges are worn and examined.

Results : The whole body dose equivalents of the same individuals for 19 months in this centre ranged from 0.107 to 4.56 mSv. The highest dose was found to be received by the individual who was involved in dispensing, radioiodine uptake and scanning section. On the other hand, lowest doses were received by individuals working registration and reception section.

Conclusion : It is evident that, the doses received by the individual depend on the nature of their duties and the exposure level is higher in the dispensing, thyroid uptake lab., gamma lab., and isotope store room. Moreover, it was found that, direct radionuclide handlers received more dose than the other working personnel.

Key word : Radioactive dose exposure, Themoluminescent dosimeter (TLD).

INTRODUCTION

Radiation survey monitoring is used to define radiation levels at various points in a laboratory or around a reactor. It is not an accurate method of assessing the accountable dose received by workers in these areas because, (i) The dose rate will vary considerably with time, depending on the operations being carried out, (ii) The working personnel will usually move around from one radiation level to another during the course of their work. To overcome these difficulties, it is normal practice for radiation working personnel in radiation areas to wear a personnel dosimeter. This is a device which measures the dose accumulated by the radiation workers. The majority of establishments are now using TLD system as the primary method of personnel monitoring. The TLD offers an accurate and stable means of measuring dose over the short and long term and find that the applications both as whole body and extremity monitors

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particularly suitable for automatic linking to computerized dose recording system in diagnostic and therapeutic nuclear medicine, radioisotopes like Technetium-99m, Iodine-131, Iodine-125 and Strontium-90 etc. are administrated for the patients orally or intravenously, and blood drawn from the patients in Iodine-131 therapy for thyroid cancer and thyrotoxicosis and beta radiation for eye (post-operative pterygium patients). The application of radioisotopes to the patients are done by scientific personnel of nuclear medicine centres and consequently, they receive more or less radiation during these applications. The patients themselves act as another source of exposure that is why scientific personnel of nuclear medicine departments are continuously being exposed to ionizing radiation at the time of their duty.

AIMS & OBJECTIVES

In the present study, the radiation dose received by the scientific personnel of Rangpur Nuclear Medicine Centre was investigated to evaluate their whole body radiation exposure due to the handling of different types of radioisotopes / radiopharmaceuticals.

MATERIALS & METHODS

We distributed the fresh TLD badges among the 17 scientific personnels at nuclear medicine centre, Rangpur. It was supplied by the Health Physics Division of Bangladesh Atomic Energy Commission every after three months. The TLD technology was started at Nuclear Medicine Centre, Rangpur on 1st December, 2000 for personnel radiation monitoring service. Each TLD badge was labeled with an identification number to distinguish one person from another. We also recorded the issuing date of TLD badges which were distributed among the scientific personnel into the register. The personnel wore the TLD badges within the region of their gonad or chest so that the response of TLD badges may be considered as the response of the whole body during the period of their duty of every day. After their duty the badges were kept into the radiation-free rooms. In this way every after three months, badges are sent to the Health Physics Division of BAEC for measuring activity. Besides, workplace radiation monitoring was done from time to time to see the radiation level of laboratory as well as comparison with results of Thermoluminescent Dosimeters technology.

RESULTS

The results of radiation dose equivalent obtained from the exposure of doses of the scientific personnel of the Nuclear Medicine Centre, Rangpur for 19 months (01/12/2000 to 30/06/2002) are shown in the table.

Subject No.	Personnel Dose Equivalent Hp (10) in mSv.	Effective dose in mSv.
01	4.568	4.568
02	1.594	1.594
03	1.440	1.440
04	1.138	1.138
05	1.095	1.095
06	0.999	0.999
07	0.988	0.988
08	0.901	0.901
09	0.895	0.895
10	0.795	0.795
11	0.638	0.638
12	0.616	0.616
13	0.126	0.126
14	0.107	0.107
15	0.000	0.000
16	0.000	0.000
17	0.000	0.000

DISCUSSION

The radiation dose received by the working personnel of Nuclear Medicine Centre, Rangpur during their routine works were investigated by Thermoluminescent Dosimeter Technology. The monitoring periods of dosimeters were 19 months. The whole body dose equivalents observed for 15 working months (450 days) ranged from 0.107 mSv to 4.568 mSv. For 15 working months of total 19 months, it was found that the highest doses were received by the individuals who work in radioisotope dispensing section, gamma camera and uptake laboratory. On the other hand, low doses were found in those who were working in the registration and reception section. It was also found that, registration, reception and RIA lab. scientific personnel received highest doses when they worked in dispensing, scanning and uptake section in addition to their normal duties (e. g. colleague on leave). The investigation shows that the dose received by the individuals depend by the nature of their duties and the exposure level is higher in the dispensing, scanning and uptake section than in the registration, reception and RIA laboratory. Moreover, direct radionuclide handlers received more radiation than other working personnel. It is inferred that, most of the scientific personnel of Rangpur Nuclear Medicine Centre received dose from 1 mSv to 4 mSv per year for their routine works with some exception. It may be mentioned that Maximum Permissible Dose is 20 mSv/year.

CONCLUSION

The radiation exposure to every individual should be kept as low as reasonably achievable. This can be achieved by keeping a maximum distance possible from the source, working with a source for the minimum time required and employing adequate shielding as well as shifting of duties. Patients should be restricted in one place during their waiting period after administration of radioisotopes, away from the working personnel. To prevent contaminations, hand gloves should be won during dispensing and administration of radioisotope as well as radioimmunoassay works. Using syringe shields during dispensing and administration of radioactive injection as well as therapeutic dose administration can minimize exposures very efficiently. It was observed that, probably some of the scientific personnel do not always follow all of the safety rules strictly and TLD badges are worn irregularly thus the results of these TLD badges are almost always found to be below the detectable range or unexpected results. The scientific personnels of Rangpur Nuclear Medicine Centre are not getting their exact individual dose equivalents due to only one set of TLD badges were supplied by the Health Physics Division of BAEC. Supplying of double set of TLD one after another may improve the situation.

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FAILURE TO VISUALIZE A MULTICYSTIC KIDNEY WITH TECHNETIUM 99M-DTPA DOES NOT PRECLUDE RECOVERABLE FUNCTION

Dr. M. A. Taher

ABSTRACT

We present a patient with multicystic left kidney as diagnosed by ultrasonography. 99m Tc-DTPA scintigram showed absent uptake by the left kidney, however, post-operative scan after partial nephrectomy was normal. In this case, absence of 99m Tc-DTPA uptake by the kidney does not necessarily mean that renal function is irreversibly lost in a patient with multiple cysts.

Key words = Multicystic kidney, Renal function, Ultrasonography, Scintigraphy.

INTRODUCTION

In general, the renal uptake of 99m Tc-diethylenetriamine pentaacetic acid (DTPA) is a measure of glomerular filtration rate (GER), and absent uptake is equivalent to non-function. In this report, we describe a patient who had non-visualized left kidney on 99m Tc DTPA scan due to obstruction by multiple cysts, but normal renal function returned after surgical removal of the cysts.

CASE REPORT

A 48 years old male presented with loin tenderness. On physical examination, the left kidney was found enlarged. Abdominal sonogram revealed multiple cysts in the left kidney pressing the left ureter. Other invesigations including biochemical tests were all normal except the 99m Tc- DTPA scan which showed absent uptake in the left kidney only. As the right kidney was normal in sonogram and 99m Tc-DTPA scintiscan, surgery on left kidney was planned. Partial nephrectomy was done to remove the cysts. A repeat scintiscan was done when the patient began to recover, it clearly showed bilateral renal activity.

DISCUSSION

This patient demonstrated recoverable kidney function as documented by reversal of absent renal uptake of 99m Tc-DTPA when thhe cysts were removed. Of interest, Taylor et. al. have described absence of 99m Tc-DMSA (dimercapto succinic acid) uptake in a patient with acute tubular necrosis from ischemia, but normal renal function returned after hemodialysis.[1] Sherman and Blaufox[2] reported reversal of absent renal uptake of 131 I-orthoiodohippurate in obstructive uropathy when the obstruction was relieved. Quinn and Elder[3] presented a patient with very poor uptake of 99m Tc DTPA scan demonstrting only mild renal impairment. Our patient shows recoverable kidney function following removal of multiple cysts and highlights the importance of ultrasonography in renal disease.

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FATAL BREAST SARCOMA

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In our country, many patients with breast lumps are neglected. A woman of 45 years came with a fungating lump in right breast initially treated by homeopaths in 1998 and later operated twice in April 2002 (Biopsy : cystosarcoma of right breast). The patient was sent to Mumbai (November 2000), but no radiotherapy/chemotherapy was given there. The patient was asymptomatic during whole of 2001,but in January 2002, chest X-ray showed opacity in upper zone of right lung. She complained bone pain in January 2002, isotope bone scan (99m Technetium phosphonate) revealed multifocal bony lesions. Radiotherapy with cobalt-60 was started in January 2002. On 3 February 2002, she suffered pertrochanteric fracture of left femur. Her ECG report showed gross abnormality which restricted chemotherapy in full dose. She was treated with traction, telecobalt radiotherapy on right lung, lumbar spine and left femur, still she received chemotherapy of FU (5 fluoruracil), Endoxan (Cyclophosphamide) and lastly single agent Holoxan (ifosfamide) with Mesna (uroprotector). She needed occasional oxygen inhalation from 15 April 2002. She had multiple cutaneous metastases on right chest in May 2002 which was also irradiated but she died at on 19 May 2002.

DISCUSSION

Non-epithelial neoplasms of breast like sarcomas of various types e.g. fibrosarcoma, leiomyosarcoma, angiosarcoma--all are extremely rare. Prognosis of these tumors are very poor. Widespread dissemination cause rapid death unless treated at a very early stage. Sarcomatous changes in a soft fibroadenoma account for more than half of the cases of sarcoma of the breast. Mean age of incidence is 48 years. A history of swelling, which is present for months or years and has recently enlarged rapidly, is frequently obtained. On examination, a large prominent swelling with dilated subcutaneous veins without retraction of the nipple is observed. It is of unequal consistency, parts of it being hard, parts being soft and parts fluctuating, due to cystic degeneration or haemorrhage. Only in the late stages does the skin become adherent (without being infiltrated) or fungation occur. Lymph nodes are not involved until very late.[1] About 25 % of breast sarcoma recur locally, in case of recurrence it may be aggressive and distant metastases may also occur.[2-6]

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THYROID DISEASES FOLLOWING GRIEF : REPORT OF THREE CASES

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ABSTRACT

Hypothyroidism and hypopituitarism following post-partum hemorrhage (PPH) is a well-established phenomenon in Sheehan's syndrome. A case of hypothyroidism following death of husband and two cases of thyrotoxicosis following death of a child and father are reported here considering their rarity.

CASE 1

A 26 years old Muslim female was examined in Sept. 1991 in Nuclear Medicine Center, Dinajpur who was quite normal before the death of her husband. She had no history of goitre, obstetric problem, goitrogens or radiation therapy. The patient complained loss of memory, constipation, anorexia and somnolence. Her pulse rate was 50/minute, skin was dry and coarse. Radioiodine uptake was low (24h. 4%), $T_3 = 0.99$n mol/L, $T_4 = 14.67$n mol/L, TSH>100/u IU/ml. The patient improved after thyroxine therapy (150 micrograms/day orally).

CASE 2

A muslim widow aged 40 years complained of increased perspirations, trembling, insomnia, weight loss, occasional loose motions and anorexia. Her thyroid hormone levels were elevated, thyrotropin (TSH) was low (Table 1) and she took carbimazole (neomercazole) 45 mg/day for 1 month (March 1997) with little benefit. She was treated with radioactive iodine-131 on 10th August 1997 (1.5 milliCuries), had follow-up visits on 27 October and 28 December 1997 which showed her status as euthyroid. Unfortunately her father died on 13 October, 2000 and she had a recurrence of thyrotoxicosis as documented by clinical examinations and hormone levels (Table 1). She had a second dose of iodine-131 therapy (1.6 milliCuries) on 29 November, 2000 and is being followed-up.

CASE 3

A hindu lady of age 35 years presented on 2nd June 1999 with bilateral exophthalmos, excessive sweating, loose motions and insomnia. Her jaundiced child died on 6th June 1999. She was confirmed to suffer from diffuse toxic goitre (Table 2), had carbimazole therapy with little benefit and was improved by iodine-131 therapy on divided doses (Table 3). She is being followed-up.

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Table 1 : Hormone levels of case 2

Date	T3	T4	TSH
22-3-97	11.92 nmol/L	648.9 nmol/L	<0.2 mIU/L
24-7-97	4.44 nmol/L	267.2 nmol/L	0.59 mIU/L
31-10-2000	20.0 nmol/L	400.0 nmol/L	0.05 MIU/L

Table 2 : Hormone levels of case 3

Date	T3	T4	TSH
31-1-2000	12.2 nmol/L	285 nmol/L	0.15 mIU/L
14-6-2000	13.05 nmol/L	400 nmol/L	0.75 mIU/L
4-12-2000	7.9 nmol/L	197 nmol/L	0.35 MIU/L

Normal ranges : T3 = 0.8-- 3.16 nmol/L
T4 = 64.5--152 nmol/L
TSH = 0.3-- 6 mIU/L

Table 3 : Iodine-131 therapy of case 3

Date	Dose I-131 in milli-Curies
9-6-1999	0.5
15-3-2000	1.0
20-8-2000	1.5
7-1-2001	0.5

DISCUSSION

Treatment of hypothyroidism is straightforward--oral thyroxine usually single daily dose. However, thyrotoxicosis is quite difficult to manage especially if we try to avoid hypothyroidism, small repeated doses of iodine-131 therapy may help in these situations as we have shown in our series reported earlier.[1] What might be the cause or precipitating factor for thyroid problem to occur following grief is not yet clear.

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RADIOIODINE THERAPY IN THYROID CARCINOMA AT RANGPUR,BANGLADESH

M A TAHER

ABSTRACT

OBJECTIVE : To show the usefulness and success of small doses of radioiodine I^{131} in the treatment of well-differentiated thyroid carcinoma.

MATERIALS & METHODS : Since 1990,in the small town Rangpur in North-west Bangladesh we are using radioactive iodine uptake (RAIU),isotope scanning (I^{131} and Tc-99m) and ultrasonography of thyroid nodules.In 1998,we started radioassay of thyroid hormones (T3 & T4) and thyrotropin (TSH). About 6500 patients were tested for suspected thyroid problems. We have given post - thyroidectmy radioiodine therapy using small doses (Table 1) to six patients (M3,F3) with clinical improvements in the follow - ups.

RESULTS: Initial results are encouraging as shown in Table 1.

CONCLUSION : We feel broad-based long-term study should be done to optimize the dose schedule of radioiodine therapy.

Key words : Radioiodine therapy,thyroid carcinoma.

INTRODUCTION

In the general population one expects to encounter one case of thyroid cancer for each 27000 individuals examined.[1] The commonest presenting feature of papillary and follicular thyroid carcinomas is an asymptomatic neck mass.Rarely skeletal or pulmonary metastases are presenting signs.Thyroid nodules are extremely common,found at palpation in 4% to 7% of an asymptomatic population,[2] in 17% to 27% of cases at sonography,[3-5] and in 50% of cases at autopsy.[6] Although most thyroid nodules are benign ,approximately 4% to 14% are malignant.[2,7-9] As an aid in determining which thyroid nodules are more likely to be cancerous,physicians have been using the functional information provided by I^{131} uptake of thyroid for more than six decades. Initially these thyroid nodules were evaluated using point-by-point counting of radioiodine distribution using collimated Geiger-Mueller(G-M) detectors. In the early 1950's the motor-driven scintillation probe with focused collimater that traversed the neck in a rectilinear fashion (scanner) was introduced. More recently,the I^{131} has been replaced by I^{123} in many countries which provides similar clinical information but delivers a much lower radiation dose to the patient.In addition the scintillation camera fitted with a pinhole collimator has largely replaced the rectilinear scan for thyroid imaging.Tc-99m pertechnetate is quite suitable for thyroid imaging but cannot provide functional information on thyroid nodules as can I^{123},but it is not yet available in Bangladesh.Several gray scale

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sonographic characteristics have been found to be highly suggestive of thyroid cancer,including microcalcifications and irregular margins,[10] but the role of color Doppler sonography in the evaluation of a thyroid nodule for malignancy has not been defined.Several reports have described no correlation between the presence of flow on color Doppler sonography and malignancy,particularly when color flow is considered as an isolated criterion.[10,11]Others have suggested that a pattern of either spotty intranodular flow[11] or hypervascular central flow [8, 12-14] on color Doppler sonography may be associated with malignancy.Frates and colleagues suggest to use color Doppler sonography in multi- nodular goitre to guide fine needle aspiration (FNA)from type 4 vascularity in a solid nodule (extensive internal flow with or without a peripheral-ring). However,the color Doppler characteristics of a thyroid nodule cannot be used to predict or exclude malignancy confidently.[15] The uses of radionuclide study (NaI^{123} or Tc^{99m} pertechnetate) in thyroid nodules suggestive of follicular neoplasms. At cytologic examination, the nodules showing uptake of radioisotope are considered to represent functioning follicular adenomas and are categorized as benign.When a thyroid malignancy is detected,the initial treatment is thyroidectomy (total or near-total). In well-differentiated thyroid cancer (DTC), radioiodine I^{131} is given to post-thyroidectomy patients for ablation of the thyroid remnants, so that occult metastasis is detected in the whole body gamma scan.Thyroid metastasis can also be ablated by radioiodine if it is iodophile in nature i.e.concentrates radioiodine.[16] In the Institute of Nuclear Medicine (Dhaka),725 patients were treated with radioiodine for DTC,amongst them one patient developed poorly differentiated mucoepidermoid carcinoma of the right parotid gland after 15 years of mixed papillary -folicular carcinoma of thyroid treated with total thyroidectomy,block dissection of lymph nodes and radioiodine therapy (80 mCi in 1987,92 mCi in 1992,200 mCi in 1996).[17] Another patient died 24 hours after a second doses of radioiodine (200 mCi) due to laryngeal stridor.[18] The optimum doses of radioiodine is controversial,and we like to focus our initial experiences of small doses.

TABLE 1 : Radioiodine therapy in thyroid carcinoma

Sex	Age (Years)	Type of carcinoma	I-131 (mCi)	Date	T3 (nmol/L)	T4 (nmol/L)	TSH (mIU/L)	Dose of thyroxin (mcg/day)
F	60	Papillary	24	19 Nov.96	2.3	87	1.45	100
M	68	Follicular	21	Nov.99-Dec.2000	2.15	77	7.75	100-150
			75	8 Jan.2001	Follow-ups in 2002 & 2003 (March/03)			
M	40	Follicular	13	4 Dec.2000	2.2	86	5.25	100
			75	8 Jan.2001	Follow-ups in 2002 & 2003 (March/03)			
M	25	Papillary	18	29 May 2001	2.7	59	0.1	100
			11	9 Aug 2001	Follow-ups on 19 Sep. & 10 Dec.2001			
F	55	Follicular variant of papillary	16	6 Aug 2001	2.2	124	3.5	50-100
			75	23 Aug 2001				
F	40	Struma ovarii (10cm pelvic mass operated)	34	31 Mar.-11 April/2002	0.1	121	0.75	
			Whole-body scans upto 9 May 2002 show tumor is shrinking and the patient is improving gradually.					

TABLE 2 : Potential complications of Radioiodine Therapy

A. Short-Term

Transient sialoadenitis and xerostomia (patients may chew gum or suck citrus sweets)[34]
Radiation gastritis
Acute radiation sickness (nausea in the first 48h,treated with anti-emetics)
Vocal cord paralysis
Transient bone marrow depression (patients of West African and West Indian background)[34]
Pain,edema and hemorrhage in metastases
Thyroid storm (thyrotoxic crisis)
Nasal pain and epistaxis
Transient impairment of testicular function[35]

B.Long-Term

Leukemia/(Total does over 1 Ci with intervals of less than 6m between treatments)[30,36]
(?)Anaplastic transformation (4 of 46 patients)[37]
Radiation pneumonitis or pulmonary fibrosis (cumulative doses over 1.5 Ci)[38]
Hyperparathyroidism
Bladder cancer (cumulative dose over 1 Ci)[30]
Permanent sterility[39]

CASE REPORTS

Case 1:

A lady aged 60 years received 24 mCi of I^{131} on 19-11-96 after near-total thyroidectomy for papillary carcinoma of thyroid.She was isolated in a cabin for one week,but no untoward side-effect was found and then she was released with a prescription of thyroxine tablets 100 micrograms/day and advised to come after 1 month for follow-up.She attended our centre on 31-12-96,17-02-97 and 23-07-97 when no thyroid-related problem was found.On 26-10-98 she was seen last when she was taking 150 microgram of thyroxine daily.She is on longterm follow up now.

Case 2:

A man of age 66 years with long-standing nontoxic multinodular goitre presented with a bony swelling on right shoulder and mild thyrotoxicosis in November/1999.Biopsy revealed follicular carcinoma of thyroid metastasized to skeletal system.Bone scan (99m Tc MDP) on 25-11-99 at Institute of Nuclear Medicine (Dhaka) revealed multiple bony metastases to left 9th and 10th ribs and right scapula.He had a near-total thyroidectomy on 18-12-99. Due to scarcity of radioisotope in the country,we gave him only 8 mCi of I^{131} on 11-1-2000 which was taken up avidly in the thyroid remnant and each of the bony metastases mentioned above.He experienced mild degree of sialadenitis after radioiodine therapy,however,it was self-limited.He is clinically euthyroid on 20-03-2000,and 23-04-2000,when he received 6 mCi of I^{131}.He is euthyroid on 3-7-2000 and on 24-03-2003.

Case 3:

A man of age 40 years came to our centre on 4 December/2000 (end of Ramzan fasting) with a post-thyroidectomy scar and a biopsy report of follicular carcinoma.His operation site was healing slowly and he went to Dhaka,but he came back to Rangpur with an advice to attend our centre. His general condition was poor-he could not sit even.We gave him 13 mCi of I^{131} and advised to follow after

the Eid holiday.He came with surprising improvements and took 75 mCi capsule on 8 January/2001.He is on thyroxine 100 micrograms/day and is now free from thyroid carcinoma as confirmed by whole body scans on March/2002 and March/2003.

Case 4:

A man of age 25 years with papillary carcinoma of thyroid had total thyroidectomy and was given 18 mCi of I^{131} on 29 May/2001. He was improved and received 11 mCi as the second dose of I^{131} on 9 August/2001. He was taking thyroxine 100 micrograms/day and was well clinically.Whole body scans were normal on 19 September and 10 December/2001

Case 5:

A woman of 55 years had total thyroidectomy for follicular variant of papillary carcinoma.She was given 16 mCi of I^{131} on 6 August/2001.She got 75 mCi on 23 August/2001.She is taking thyroxine 50-100 microgram/day and is well on March/2003.

Case 6:

A woman of age 40 years came with abdomino-pelvic lump (10 cm dia.) which was operated.Biopsy revealed a case of struma ovarii.She was given 34 mCi of I^{131} in divided doses from 31 March to 11 April/2002.She was improving gradually as shown by whole body scans upto 9 May/2002.

Long-term follow-ups are being done in all the six cases.

DISCUSSION

No serious complication was seen following radioiodine I^{131} therapy of thyroid carcinoma except mild sialadenitis in one patient which was self-limited (Table 2).Acute inflammation of the salivary glands (sialadenitis) develops in 10% of the patients treated with I^{131} for thyroid cancer.[19] Rarely,hyperthyroidism and thyroid cancer co-exist as in one of our follicular cancer patient-one study reported 9 thyroid cancer in 720 patients with hyperthyroidism.[20]

In post-surgical follow-up of well -differentiated thyroid cancer,the patient is given high dose radioiodine ablation therapy and thyroxine tablets to suppress thyrotropin (TSH) stimulation.Thyroid cancer patients should have whole body scan annually to check recurrence and/or distant metastasis, (which may also be ablated by I^{131} therapy), until there is no detectable tumor or metastatic uptake for two consecutive years.

Thyroid cancer patients are isolated for I^{131} therapy to avoid undue gamma radiation to the neighbours.However,the detailed regulations vary from country to country, e.g. the maximum dose allowed as outdoor patient is 5 mCi in some of the European countries,19 mCi in U.K.,but 29.9 mCi in U.S.A..Johansen at al[21] showed that 29 mCi was as effective as 100 mCi in ablating residual thyroid tissue since 81% were ablated by the first dose.Whole-body scan following high-dose I^{131} therapy provides improved detection of local and distant metastases as compared to low-dose diagnostic studies,[22,23] but a false-positive result may be found rarely.[24] Grigsby[25] showed that only 10% (6 of 63) of patients had additional information in post-treatment total body I^{131} scans.Arad et al.[26,27] and Rudavsky et al.[28] used 2 or 3 outpatient doses of 20 to 55 mCi each 48 hours or 1week apart which can reduce cost and patient inconvenience.Massino et al.[29] gave low dose of I^{131} (10-50mCi) often repeated and increased later in children and adolescent patients of thyroid cancer.Edmonds and Smith reported that risk of bladder cancer and possibly leukemia (3 cases each in a group of 258)are increased,particularly when many treatments are given with initial ablation dose of 80 mCi followed by 150 mCi at intervals of a few months,[30] but the Swedish Cancer Registry of large cohort of patients with

thyroid cancer treated with I^{131} did not show any long-term increase in incidence of solid tumors (including bladder tumors).[31] Large dose of I^{131} may produce side-effects e.g.tracheal compression or cerebral edema 12 hours after 200 mCi of I^{131}.[32]Rarely, if ever,are bone marrow metastases cured,even when total doses reach as high as 2.5 Ci.[33] Permanent sterility occurs in less than 10% of men cumulatively given 300mCi and over 90% treated with 800 mCi. In women,permanent sterility may occur in upto 60% of those receiving I^{131} in the range of 800mCi.[39]

Jixiao found that in general there were good correlation between[18] FDG findings and I^{131} scans, though discrepancy was also significant-FDG PET (flourodeoxyglucose positron emission tomography) scans revealed other 12 lesions that were not identified on I^{131} scans in 51 cases.[40]

CONCLUSION :

We fell broad-based long-term study should be done to optimize the dose schedule of radioiodine therapy.

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UTILITY OF NEPHROSONOGRAM PRIOR TO ISOTOPE RENOGRAPHY

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ABSTRACT

The purpose of the present paper was to determine if nephrosonogram is useful prior to radionuclide renogram.

METHODS : 752 renograms (464 males, 288 females, age range 18 months to 77 years) were done, amongst these prior ultasound scans were performed in 612 patients. Additional imaging tests e.g. IVU, renal angiogram etc. were done in 88 cases only.

RESULTS : Significant increases in the accuracy of renogram were observed with prior ultrasound scan. We performed nephrosonography almost routinely prior to radionuclide renogram by probe renograph or gamma camera using I-131 hippuran orthoiodohippurate (OIH) or Tc 99m diethylene triamine pentaacetate (DTPA). The 1st or arterial phase may be missed in probe renograph if the renal hilum is not marked by ultrasound. Recently gamma cameras are available in our country and probe renograph is almost obsolete. Therefore nephrosonogram may not be so essential to study individual renal function. However, in some gamma cameras, one or more photomultiplier tube (PMT) may be out of order and useful field size may be limited. In these situations prior nephrosonogram may be helpful in optimization of quality of gamma camera renogram also. All the Nuclear Medicine Centres in Bangladesh are equipped with Ultrasonographs and no extra charge is made for nephrosonogram prior to radionuclide renogram.

CONCLUSIONS : We recommend USG prior to renogram. Renal hilum os easily marked by ultrasounf scan and during nephrosonography (USG), some other important findings e.g. renal size, shape, position, number, calculus, cyst, neoplasm etc. also can be visualized. Intravenous Urography (IVU) and digital subtraction angiography (DSA) are rarely needed*.

Key words : Isotope/redionuclide renogram, nephrosonogram, USG.
*Presented in 2nd ARCCNM (Asian Regional Co-opertive Council of Nuclear Medicine) and 8th National Conference of Society of Nuclear Medicine, Bangladesh (6-8 Feb. 2003)

INTRODUCTION

Ultrasonography (USG) has a reported sensitivity of up to 98% for detecting renal obstruction.[1] However, the diagnostic yield of renal USG for excluding hydronephrosis in patients in

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intensive care units without predisposing factors for obstructive uropathy is very low.[2] Since 1981, we are performing nephrosonography almost routinely prior to radionuclide renogram (RR) by probe renograph or gamma camera renogram using I^{131} hippuran/ orthoiodohippurate (OIH) or Tc 99m diethylene triamine pentaacetate (DTPA). The 1st or arterial phase may be missed in probe renograph if the renal hilum is not marked by ultrasound. Recently gamma cameras are available in our country and probe renograph is almost obsolete. Therefore nephrosonogram may not be so essential to study individual renal function. However, in some gamma cameras, one or more photomultiplier tube (PMT) may be out of order and useful field size may be limited. Therefore prior nephrosonogram may be helpful in optimization of quality of gamma camera renogram also. All the Nuclear Medicine Centres in Bangladesh are equipped with Ultrasonographs. Individual kidney function is best assessed by radioisotope renogram (RR)[3] which is divided into three phases : (a) arterial or vascular (b) secretory or glomerular and (c) excretory or clearance. Renal hilum is easily marked by ultrasound scan and during nephrosonography (USG), some other important findings e.g. renal size, shape, position, number, calculus, cyst, neoplasm etc. also can be visualized.[4-6] Intravenous Urography (IVU) and digital subtraction angiography (DSA) are rarely needed. Therefore, we like to perform nephrosonography prior to radionuclide renogram and in this study we compare the two situations, namely (a) sonogram+ renogram (USG + RR) and (b) only renogram (RR) in various diseases. (Fig.1)

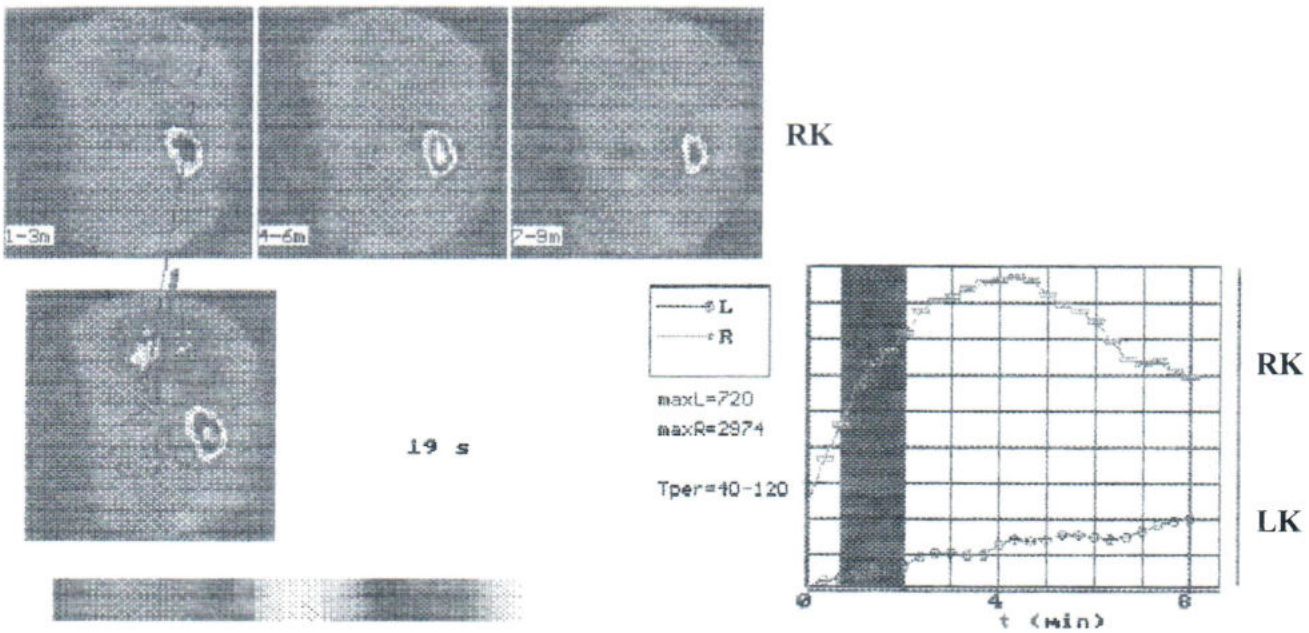

Fig 1 ^{99m}Tc DTPA Renogram showing normal right kidney and poorly functioning left kidney.

MATERIALS AND METHODS

During December 1981 to December 2001, we performed 752 renograms (464 males, 288 females, age range 18 months to 77 years) in the Institute of Nuclear Medicine at Dhaka, Nuclear Medicine Centres at dinajpur and Rangpur, amongst these prior ultrasound scans were done in 612 patients. Additional imaging tests e.g. IVU (Intravenous urogram), renal angiogram etc. were done in 88 cases as per advice of the referring physician/surgeon which was again influenced by socioeconomic factors and available facilities. (Table-1) We have done 198 diuresis renograms. As the diuretic agent, we have used, frusemide injections in 68 cases and oral water in 130 cases.[7,8] Results of renogram and USG are shown in Table-2. Water diuresis renography is useful for obstructive uropathy.

Table 1 Number of patients in different places and periods.

Place of study	Period	USG + RR	RR	Addl. Investigations
Inst. of Nuc. Med.	Dec. 81-Dec. 88	375	24	49
NMC, Dinajpur.	Jan. 89-July 94	76	55	12
NMC, Rangpur.	Aug. 94-Dec. 01	161	61	27
		612	140	88

Table 2 Results of sonogram and renogram

No. of cases	Diagnosis	Sonogram	Renogram
145	Urolithiasis	Echogenic structure casting acoustic shadow	Delayed excretion only in advanced stages
137	Hydronephrosis	Pelvicaliectasis	Prolonged secretory & excretory phases
139	Medico-renal diseases e.g. diabetes, hypertension	(a) Swollen/small kidney (b) Renal corticomedullary indistinction (c) Normal echoes	(a) Small arterial phase (b) Prolonged secretory phase
61	Polycystic kidney	Echofree areas	Distorted secretory phase
29	Relative renal ischemia	Small kidney	Small arterial phase (ischemic)
15	Ectopic kidney	Abnormal site e.g. pelvis	(a) Normal renogram (b) Ischemic kidney
28	Renal neoplasm	Irregular echoes	All phases depressed
25	Congenital solitary kidney	Single kidney	Single kidney
33	Normal kidneys	Normal echoes	Normal renograms
612			

RESULTS

The patients who had both nephrosonogram (USG) and radionuclide renogram (RR) rarely needed additional imaging tests, e.g. IVU and angiogram. A young man of 19 years had normal DTPA renogram, but abnormal in hippuran study, later he needed hemodialysis and renal transplant for chronic renal failure.

DISCUSSION

The reasons of not doing ultrasound in all cases are (a) sometimes the ultrasound scanner was out of order (Institute of Nuclear Medicine, Nuclear Medicine centre, Rangpur) or not available (Nuclear Medicine Centre, Dinajpur), (b) rarely the workload was so high that we had to avoid sonography.

CONCLUSION

We Recommend routine nephrosonogram prior to radionuclide renogram to diminish the need of invasive, risky and expensive investigations e.g. IVU and angiogram. Sometimes other congenital anomalies e.g. infantile uterus ect. may also be diagnosed.[9-11]

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PECULIAR PRESENTATIONS OF ADULT HYPOTHYROIDISM

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ABSTRACT

Recently we found six cases of adult-onset hypothyroidism,[1-2] one of them is subclinical (normal T_4, high TSH), two are familial and one had carpal tunnel syndrome (tingling in the fingers from compression of median nerve in the carpal tunnel).

INTRODUCTION

Hypothyroidism is a relatively common endocrine disorder seen under ordinary circumstances with characteristic clinical signs and symptoms, including cool dry skin, puffy face, non-pitting edema, cold intolerance, constipation, hoarse voice, slow return of reflexes, bradycardia, weight gain, anorexia, increased somnolence and loss of memory.[1] Diagnosis is confirmed by the determination of the serum levels of thyroxine (T4) and thyrotropin or thyroid-stimulating hormone (TSH). The general nature of the effects of thyroid hormone result in abnormalities in many organ systems producing a complex and diverse array of signs and symptoms in addition to those noted earlier. Primary hypothyroidism is associated with hematologic (anemia and coagulopathy), muscular (myopathy), cardiac (cardiomegaly), neurologic (carpal tunnel syndrome), rheumatologic abnormalities (arthralgias,joint effusion, hyperuricemia and associated autoimmune disease), which may dominate the clinical picture and serve as the manifesting sign or symptom of the disorder.[2] Therefore, we like to present a few cases of hypothyroidism with peculiar features.

CASE 1

A female patient aged 48 years was complaining of chest pain and shortness of breath. Chest X-ray and echocardiography revealed pericardial effusion. Serum hormone levels confirmed hypothyroidism (table 1). She was improved by thyroxine 50 micrograms per day.

CASE 2

A male patient of 40 years complained of weight gain. He had no other symptom, but was confirmed to be hypothyroid (Table 1) and was improved by thyroxine.

CASE 3

A male person aged 32 years complained of hoarse voice. He was found to be subclinically hypothyroid. (Table 1, normal T_3 & T_4 but high TSH).

CASE 4 & 6

They are two sisters. There are other hypothyroid patients in their family - paternal aunt and uncle, all of them are doing well on thyroxine therapy.

CASE 5

A hindu lady of 48 years complained of tingling sensation in the fingers (due to compression of median nerve in the carpal tunnel). She was confirmed to be hypothyroid and cured by thyroxine.

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TABLE 1 Hormone levels

Case No.	Sex	Age (Yrs.)	Chief complaints	T3 nmol/L	T4 nmol/L	TSH mIU L	Comment
1	F	48	Pericardial effusion	0.65	17	95	Improved by thyroxine therapy
2	M	40	Weight gain	0.3	61	69.5	Do.
3	M	32	Hoarse voice	1.75	116	5.5	Subclinical hypothyroid
4	F	28	Anorexia	0.15	9	97.5	Familial hypothyroid
5	F	35	Carpal tunnel syndrome	1.05	48	90	Improved by thyroxine therapy
6	F	32	Dull memory	1.85	22	100	Familial hypothyroid

DISCUSSION

A triad of congenital perceptive hearing loss, goitre and abnormal perchlorate test is defined as Pendred's syndrome.[3] It is an autosomal recessive form of sensorineural deafness associated with goitre in that the perchlorate test shows an abnormal organification of non-organic iodine. Three brothers of seven siblings who are affected by Pendred's syndrome are reported.[4] Our cases 4 and 6 are two hypothyroid sisters who have other hypothyroid patients in their family-paternal aunt and uncle are also hypothyroid, all these four persons are adult-onset hypothyroid and doing well on thyroxine therapy. Screening of neonates for congenital hypothyroidism is being done in many countries,[5] but screening of pregnant woman for hypothyroidism is not yet universal.[6] Haddow et al. and Utiger encouraged adequate iodine intake and it should be increased during pregnancy.[7,8]

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