

Utility of Posterior Oblique Views in ^{99m}Tc -DMSA Renal Scintigraphy in Children

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Objective: Procedure guidelines suggest that optimal ^{99m}Tc -dimercaptosuccinic acid (DMSA) planar scintigraphy of the kidney should include right and left posterior oblique views in addition to the posterior projection. However, in a small number of restless children, it is sometimes difficult to get 3 good-quality images. The aim of this study was to evaluate the prevalence of cases in which posterior oblique views were useful for interpreting ^{99m}Tc -DMSA renal scintigraphy.

Methods: Three nuclear medicine specialists were asked to interpret 40 ^{99m}Tc -DMSA renal scans twice, first on the basis of the posterior projection only and then by using the posterior and the right and left posterior oblique views.

Results: The oblique posterior views were considered useful by observers 1 and 2 for 4 kidneys and by observer 3 for 5 kidneys and were considered somewhat useful for up to 7 kidneys. The addition of oblique posterior views changed the interpretation on 5 occasions for observer 1, on 9 occasions for the observer 3, and on no occasion for observer 2. On average, therefore, changes in interpretation occurred for fewer than 6% of the kidneys. Moreover, no relationship was observed between the opinion of the clinicians that oblique views were useful and changes in the scintigraphic interpretations.

Conclusion: Oblique views were found useful in only a few cases and, even in these cases, did not significantly modify the interpretations. Therefore, when restless children are being imaged, the focus should be on obtaining a good posterior projection, even at the price of not having oblique posterior views.

Key Words: renal scintigraphy; children; DMSA

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For the diagnosis of acute pyelonephritis in children, imaging with ^{99m}Tc -dimercaptosuccinic acid (DMSA) is now widely accepted as a procedure of choice. Procedure guidelines (1,2) suggest that optimal imaging should include right and left posterior oblique views in addition to the posterior projection. However, in a small number of restless

children, it is sometimes difficult to get 3 good-quality images. The aim of this study was to evaluate whether obtaining posterior oblique views is mandatory in ^{99m}Tc -DMSA renal scintigraphy

MATERIALS AND METHODS

Scintigraphic Procedure and Selection of Studies

^{99m}Tc -DMSA scintigraphy was performed at least 2 h after the administration of an adult dose of 100 MBq of ^{99m}Tc -DMSA, scaled on a body surface basis. Posterior and posterior oblique views were obtained using a high-resolution collimator. A zoom factor of between 1 and 2 was used for small children. Pinhole views (2- to 3-mm aperture) were used for infants. At least 300 kcts per image were collected. For pinhole views, 100 or 150 kcts were collected or a preset time of about 10 min was used. From our database, 40 ^{99m}Tc -DMSA studies were selected retrospectively at random.

Analysis

Three nuclear medicine specialists were asked to twice interpret 40 ^{99m}Tc -DMSA renal scans. The first interpretation was based only on the posterior projection. The physicians were asked to determine whether the kidneys were probably normal, probably abnormal, or of indeterminate normality.

One week later, the same 3 observers were asked to reinterpret the same studies using the posterior and the right and left posterior oblique views. The observers had no access to their first interpretation. In addition to the previous question, the observers were also asked, for each kidney, to determine whether they considered the oblique views helpful for interpretation.

RESULTS

Table 1 shows the results given by the 3 observers for the 80 kidneys. The proportion of probably normal, indeterminate, or probably abnormal kidneys remained roughly the same whether the scintigraphy was interpreted with or without the oblique posterior views.

When only the posterior view was used, complete agree-

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TABLE 1
Effect of View on Scintigraphic Interpretation

Interpretation	Posterior only			Posterior and oblique		
	Ob. 1	Ob. 2	Ob. 3	Ob. 1	Ob. 2	Ob. 3
Normal	56	66	58	59	66	59
Indeterminate	6	3	5	1	3	7
Abnormal	18	11	17	20	11	14

Ob. = observer.

TABLE 2
Utility of Oblique Views and Changes in Scintigraphic Interpretation

Were oblique views useful?	Belief in utility			Changes in interpretation		
	Ob. 1	Ob. 2	Ob. 3	Ob. 1	Ob. 2	Ob. 3
Yes	4	4	5	1	0	2
Somewhat	5	4	7	2	0	1
No	71	72	68	2	0	6

Ob. = observer.

ment (3 observers giving the same interpretation) was observed for 65 kidneys; partial disagreement (2 observers giving the same interpretation), for 13 kidneys; and total disagreement, for 2 kidneys. When both the posterior view and the oblique view were used, complete agreement was observed for 67 kidneys; partial disagreement, for 9 kidneys; and total disagreement, for 4 kidneys.

The addition of oblique posterior views changed the interpretation on 5 occasions for observer 1 and on 9 occasions for observer 3 (Table 2). The oblique posterior views were considered useful by observers 1 and 2 for 4 kidneys and by observer 3 for 5 kidneys. The oblique posterior views were considered somewhat useful for up to 7 kidneys. No relationship, however, was observed between the belief of the clinicians that oblique views were useful and changes in the scintigraphic interpretations. Figures 1 and 2 show examples of the scintigraphic images.

DISCUSSION

Planar scintigraphy presents a 3-dimensional object in 2 dimensions. Information could therefore be missed because of superimposition of structures. For this reason, most planar images are obtained in multiple projections.

Procedure guidelines for ^{99m}Tc-DMSA planar renal scintigraphy (1,2) suggest that optimal testing should include right and left posterior oblique views in addition to the posterior view. Our results indicate that oblique views were useful in only a few cases and did not significantly modify the interpretations. The addition of

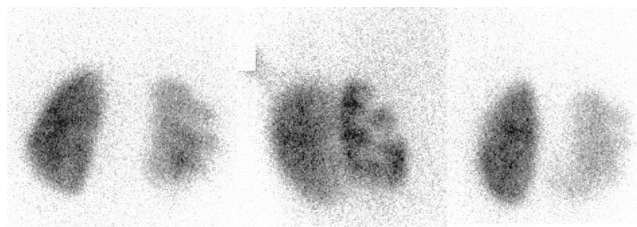


FIGURE 1. Example of scintigraphic images in which posterior oblique views (middle and right) were considered useful. According to observers, extent of abnormalities was better delineated in right posterior oblique view (middle) than in posterior view (left). Addition of oblique views, however, did not change interpretation of findings. Findings were already considered abnormal on basis of posterior view alone.

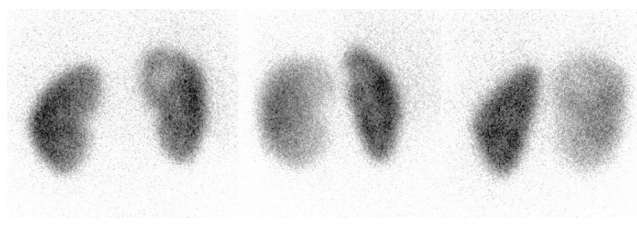


FIGURE 2. Example of scintigraphic images in which posterior oblique views (middle and right) were considered to add no new information. Hypoactive zone was better circumscribed in posterior view (left) than in right posterior oblique view (middle).

oblique posterior views changed the interpretation for fewer than 6% of the kidneys. Moreover, no relationship was found between the belief of the clinicians that oblique views were useful and changes in the scintigraphic interpretations. The limited added value of oblique posterior views was probably due to the fact that a kidney, especially in children, is not a thick organ. Therefore, the problem of superimposition between lesion and normal tissue is less evident. Moreover, in the oblique view the kidney is thicker, and some lesions could thus be better delineated in a posterior projection (Fig. 2). This does not mean, however, that oblique views should not be obtained. They do make the interpretation of the posterior view easier in a few cases.

CONCLUSION

Performing renal scintigraphy on restless children is a practical problem for us. Because drug sedation is not generally advocated (1,2), getting 3 good-quality images is sometimes difficult. The results of the present study suggest that, for restless children, all efforts should be on obtaining a good posterior view, even at the price of not having oblique posterior projections.

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