Section: Radiodiagnosis

Original Research Article

STUDY THE ROLE OF TRIPHASIC COMPUTED TOMOGRAPHY IN EVALUATION OF ADRENAL INCIDENTALOMA

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Received *: 07/10/2025*
Received in revised form *: 14/11/2025*
Accepted *: 04/12/2025*

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DOI: 10.70034/ijmedph.2025.4.541

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (4); 3021-3023

ABSTRACT

Adrenal incidentalomas often include nonfunctioning adrenocortical adenomas but may also signify other significant conditions like adrenocortical carcinoma or pheochromocytoma. With the increasing utilization of cross-sectional imaging, recognizing adrenal masses has become common, leading to challenges in distinguishing between benign and malignant growths. The study aims to evaluate the role of triphasic CT in identifying and characterizing adrenal incidentalomas to guide clinical management. A prospective study was conducted at a tertiary care hospital involving 50 patients with 54 adrenal incidentalomas detected on triphasic CT. The evaluation included imaging in arterial, portal, and equilibrium phases, focusing on measurements of attenuation values and washout percentages to differentiate between adenomas and non-adenomas. The study included 25 adenomas and 29 non-adenomas. Significant differences were found between the two groups in terms of size and unenhanced CT attenuation values. Triphasic CT is a valuable tool in the evaluation of adrenal incidentalomas, providing clear differentiation between benign and malignant lesions based on enhancement patterns and attenuation values. Future research should focus on larger cohorts to confirm these preliminary results.

Keywords: CT, Adrenal Incidentaloma.

INTRODUCTION

Adrenal incidentalomas often include non-functional adrenocortical adenomas but may also signify other significant conditions like adrenocortical carcinoma or pheochromocytoma. With the increasing utilization of cross-sectional imaging, recognizing adrenal masses has become common, leading to challenges in distinguishing between benign and malignant growths.[1-5]

Dynamic contrast-enhanced CT alone cannot characterize most of these lesions. However, it's known that unenhanced CT can aid in differentiating benign from malignant disease. Typically, benign adenomatous lesions display relatively low density on unenhanced CT due to abundant intracellular fat. Conversely, malignant lesions are lipid-poor and exhibit higher attenuation values.[6-10]

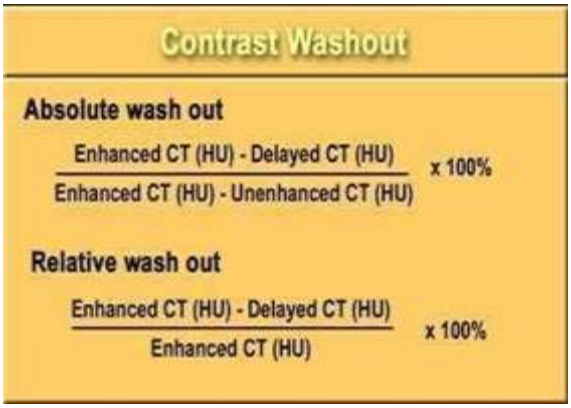
It has been proposed that Relative Percent Washout and Absolute Percent Washout tests are so effective for differentiating adenomas from non adenomas that other imaging tests (including MR and PET) should only be needed in unusual circumstances.[11,12]

MATERIALS AND METHODS

A prospective study was conducted at a tertiary care hospital involving 50 patients with 54 adrenal incidentalomas detected on triphasic CT. The evaluation included imaging in arterial, portal, and equilibrium phases, focusing on measurements of attenuation values and washout percentages to differentiate between adenomas and non- adenomas.

CT attenuation values were measured by using a circular region of interest on images of the adrenal lesion in question. The region of interest covered atleast one-half of the mass, excluding cystic, calcified, or necrotic regions

Contrast Washout Formula



RESULTS

The final clinical diagnosis was adrenal adenoma for 25 masses and non-adenoma for 29 masses, confirmed at pathologic examination.

The mean attenuation value of adenoma and non adenoma on nonenhanced enhanced and delayed enhanced CT scans-

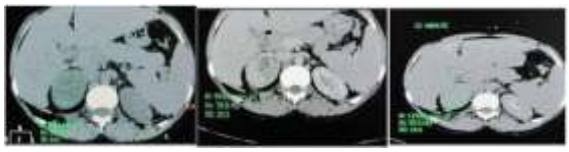


Figure 1

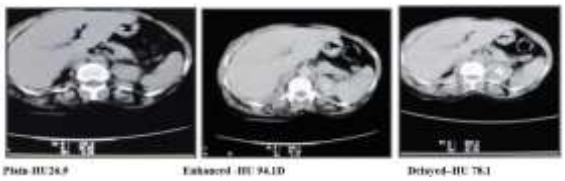


Figure 2

Table 1

	Unenhanced	Enhanced	Delayed
Adenoma	23.5	75.3	41.6
Nonadenoma	27.2	66.2	45.9

Mean Percentage Washout Values

Table 2

	Absolute percent washout	Relative percent washout
Adenoma	65.5%	44.6%
Nonadenoma	54.4%	30.6%

Table 3

Absolute Percent Washout	34.9	Nonadenoma	Correct
Relative Percent Washout	29.1	Nonadenoma	Correct
Pathological Diagnosis	Metastasis	Nonadenoma	

Table 4

Absolute Percent Washout	23.8	Nonadenoma	Correct
Relative Percent Washout	17.0	Nonadenoma	Correct
Pathological Diagnosis	Metastasis	Nonadenoma	

DISCUSSION

First, most adenomas contain large amounts of intracellular lipid, resulting in lower attenuation values at unenhanced CT than non adenomas.

All adenomas, including those without substantial lipid content, tend to have a more rapid loss of attenuation value soon after enhancement with intravenous contrast material.

The purpose of this study was to characterize the adrenal incidentaloma using absolute and relative percentage washout method.

Absolute percentage enhancement washout correctly diagnosed 24 of 25 adenomas.

Based on previous studies conducted on adrenal masses and their unenhanced attenuation values, it has been established that masses with very low unenhanced attenuation values are adenomas with high sensitivity and specificity. Thus a mass that is10HU or less on unenhanced CT images is diagnosed radiologically as an adenoma and a CT contrast washout study is not undertaken.

Based on the attenuation value unenhanced, enhanced and delayed enhanced CT and calculations of absolute and relative percentage enhancement washouts, adenomas demonstrate a greater percentage of enhancement washout compared with non adenomas.

CONCLUSION

Adenomas can be differentiated from non adenomas at delayed enhanced CT examinations with absolute and relative percentage enhancement washout calculations.

This protocol enables nearly all adrenal masses to be diagnosed with a high sensitivity and specificity.

Thus CT contrast washout study for adrenal masses plays a definitive role in guiding clinical management.

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