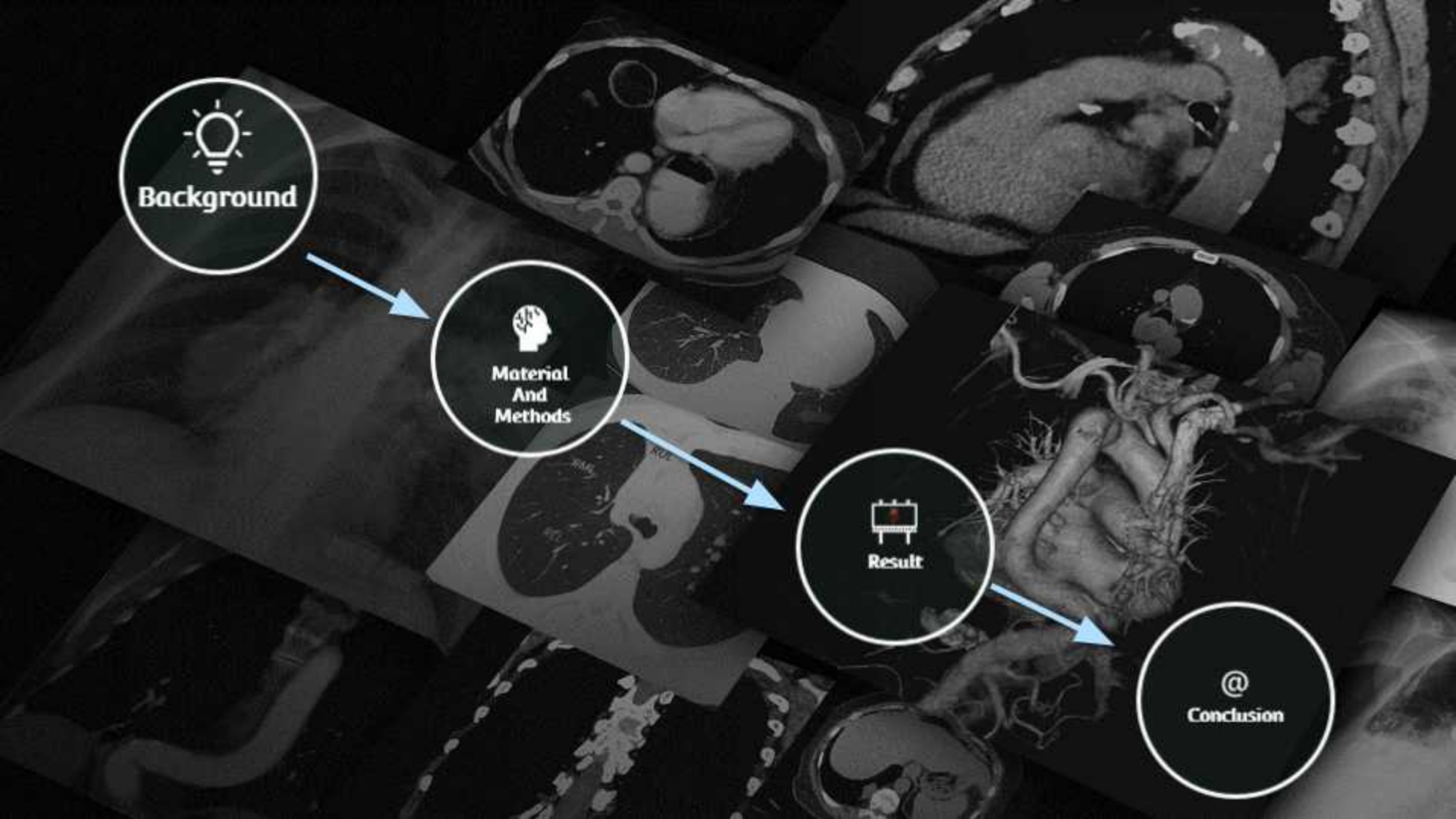




Measurement of Cardiothoracic Ratio in Thorax Radiography Using Computed Tomography

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Background

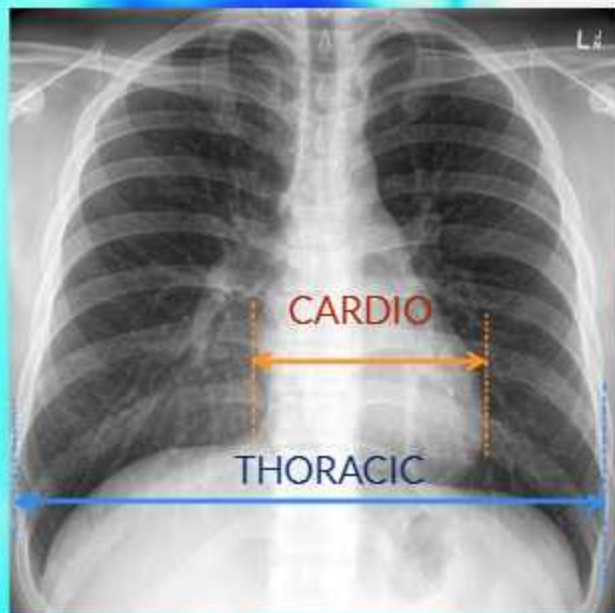
Background



Heart disease is a disease that is a major health problem in both developed and developing countries and is the number 1 cause of death in the world. In Indonesia, the death rate due to heart attack reaches 26-30% (WHO, 2015).



One of the signs of this disease is an enlargement of the size of the heart or what is called cardiomegaly (Mayo, 2014).



“Enlargement of the heart can be measured by the cardiothoracic ratio. The size of the heart should be normally restricted in size to be less than the normal thoracic width less than 50% of the original, so it can reduce the accuracy of the measurement (Sutton, 2006).”



**Material
And
Methods**

Material And Methods



This study is an analytical observational study with a diagnostic test approach to assess the sensitivity and specificity of the Measurement of Cardiothoracic Ratio in Thorax Radiography Using Computed Radiography



The research was conducted in August – November 2020 at Radiology Installations in Semarang, Central Java.

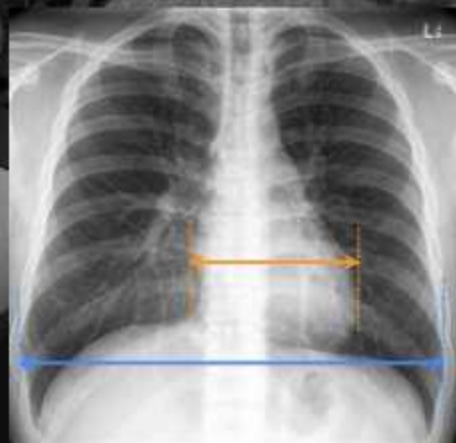


204 images from 204 patients were included. 30 images from 30 patients were excluded due to inappropriate collimation and lack of contrast and density.

Material And Methods



Conventional measurement results by radiologist were compared to automatic measurements by CR.



Sensitivity and specificity of CTR measurement using Matlab calculated, referred to the Conventional measurement results by radiologist as the gold standard

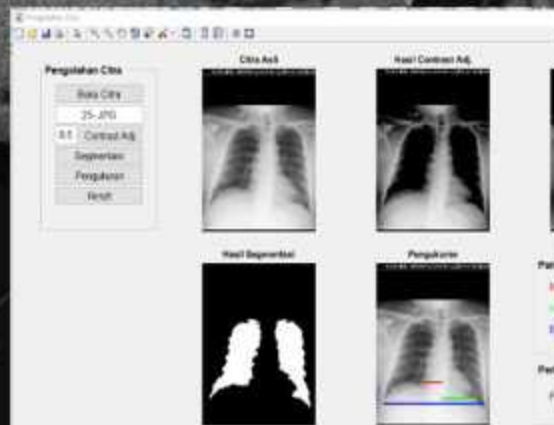
Material And Methods



Measurement of
CTR value Original
radiograph



Measurement of
CTR with CR



Measurement of
CTR with Matlab



Result

Result

Conventional CTR
Measurement

CR CTR Measurement			
	Cardiomegaly	Normal	Total
Cardiomegaly	119	3	122
Normal	8	74	82
Total	127	77	204



Sensitivity value = $119 : 127 = 0,9370 = 93,70 \%$

Spesificity value = $74 : 77 = 0,9610 = 96,10 \%$

Based on the table, it can be seen that the sensitivity value of the cardiac CTR measurement method with CR and conventional is 93.70% and the specificity value of cardiac CTR measurement with CR and conventional is 96.10%, which means there is no difference.

Result

Mc Nemar Test		
	CTR_CR & CTR_Conventional	CTR_CR & CTR_Matlab
N	204	204
Exact Sig. (2-tailed)	0.227 ^b	1.000 ^b
b. Binomial distribution used.		

Table 3 shows that the McNemar statistical test results between doctor's CTR measurements and CTR values p value > 0.05 , which means there is no difference in determining the CTR value of the heart performed by a radiologist, and using the CR modality.



@

Conclusion

Conclusion



Cardiothoracic Ratio (CTR) measurement is very accurate measured using Computed Radiography (CR) performed by a radiographer.



There is no difference in the results of cardiac CTR measurements on conventional chest radiographs (by radiology specialists) with CR modalities.



To maintain the quality of the contrast remains up to standard and constant, it is necessary to have a radiographer as the person in charge of operating the CR.

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Thank you
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