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The effect of giving blitung banana as a negative oral contrast agent on the examination of magnetic resonance cholangiopancreatography

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ABSTRACT

Superposition between the pancreatobiliary system and the gastrointestinal system on magnetic resonance cholangiopancreatography examination makes the resulting image appear less clear and can look like pathology because it can mimic the image of certain lesions. To overcome this we need negative oral contrast agent. Blitung banana containing iron and manganese are used as an alternative to negative oral contrast agent in the examination of magnetic resonance cholangiopancreatography to improve anatomical information of the pancreatobiliary system and reduce the intensity of signals in the gastrointestinal system.

This study used a quasi experimental design with the aim of seeing differences in anatomic information on magnetic resonance cholangiopancreatography images between before and 5 minutes after giving blitung banana as negative oral contrast agent. The study was conducted on 7 healthy participants and 2 radiologists as respondents to evaluate the images.

The results showed an increase in anatomic information on the pancreatobiliary organ system gall bladder, common bile duct, main pancreatic duct and a reduction in signal intensity of the gastrointestinal system in the stomach organs after administration of blitung banana on magnetic resonance cholangiopancreatography examination.

Keywords: Magnetic Resonance Cholangiopancreatography, Negative Oral Contrast Agent, Blitung Banana.

INTRODUCTION

Magnetic resonance cholangiopancreatography is a medical imaging technique using magnetic resonance to visualize bile trees and pancreatic ducts in a non invasive and safe way [1-3]. The basic principle of magnetic resonance cholangiopancreatography is the imaging of bile tree and pancreatic fluids by suppressing dense

structured background signals using T2 weighted sequences [1, 2, 4].

Basically, magnetic resonance cholangiopancreatography does not use contrast agent because the fluid in the pancreatobiliary system functions as an intrinsic contrast agent that will appear bright [2, 5, 6]. However, when there is a superposition between the gastrointestinal system

and the pancreatobiliary system, the resulting image will be less clear because gastric and duodenal fluid can blur the imaging of the biliary tract and pancreas so that it disturbs the imaging, otherwise it can sometimes look like a pathology because it can mimic the image of certain lesions [6-9]. To overcome this problem patients are asked to fast before the examination and use the acquisition of different sequences. However, sometimes the intensity of the undesired signal from the gastrointestinal system is still often seen so that a negative oral contrast agent is needed which will produce a signal intensity of the pancreatobiliary system fluid appearing bright [3, 9].

Negative oral contrast agent have high molecular metal ions such as iron (Fe) and manganese (Mn) which have superparamagnetic (iron) and paramagnetic (manganese) properties. These iron and manganese components are used to shorten the relaxation time of T2 water and to reduce unwanted fluid signals from the stomach, duodenum and bowel [8-13].

Several negative oral contrast agent for magnetic resonance imaging (MRI) of the abdomen are available on the market such as gadopentate dimeglumine, ferric ammonium citrate, manganese chloride, kaolinate, antacid, barium sulphate, ferric particles and Gd-DOTA gadolinium [14, 15]. However, these negative oral contrast agent have limitations such as bad taste, being too runny in the digestive tract, its availability is little on the market and the price is relatively expensive [8, 14, 16].

Of the limitations of previous studies, the authors are interested in conducting further research to see the differences in anatomical information on the magnetic resonance cholangiopancreatography image by using blitung banana which is used as an alternative to negative oral contrast agent on magnetic resonance cholangiopancreatography examination with consideration of good taste, easily obtained and relatively affordable prices.

METHOD

Research Types and Design

This type of research is an experimental study with a quasi experimental research design.

Population and Research Samples

The sample in this study were 7 healthy participants who were selected and fulfilled the inclusion criteria consisting of young men and women with an average age of 25 years who had a body mass index of around 23.

Negative Oral Contrast Agent

The negative oral contrast agent used was 200 grams of blitung banana containing 1.01 mg of iron and 1.51 mg of manganese.

Scanning Techniques

The sequence used is T2 HASTE fat saturation coronal thick slab using MRI Siemens 1.5 Tesla.

Image Assessment

Image assessment was carried out by 2 radiologists using a Likert scale. The assessment of the anatomy of the pancreatobiliary system and the reduction in signal intensity of the gastrointestinal system were carried out with the criteria of a bad value of 1, a sufficient value of 2 and a good value of 3. Data analysis was performed using the Wilcoxon test using SPSS 21 statistics.

RESULTS

To determine the effect of giving blitung banana as negative oral contrast agents to the anatomic information of the pancreatobiliary system and the reduction in the intensity of the gastrointestinal system signal, images before and after treatment from 7 healthy participants were evaluated by 2 radiologists. Evaluation criteria carried out by radiologists include bad, sufficient and good.

The anatomy of the pancreatobiliary system assessed includes gall bladder, common bile duct and main pancreatic duct. Signal intensity of the gastrointestinal system assessed is the stomach.

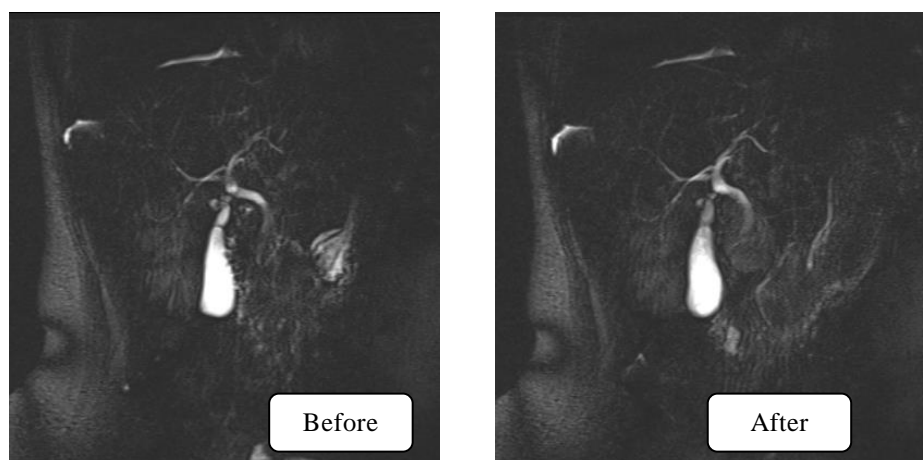


Figure 1: Magnetic resonance cholangiopancreatography images before and after 5 minutes of giving blitung banana to healthy participants

Data analysis on the assessment of pancreatobiliary system anatomy information and signal intensity of the gastrointestinal system was

carried out with the Wilcoxon test which is presented in table 1 and table 2 below:

Table 1 Wilcoxon test results of the effect of giving blitung banana to the anatomical information of the pancreatobiliary system

Anatomy	Mean Rank		p value
	Negative Ranks	Positive Ranks	
Gall bladder	0,00	3,50	0,020
Common bile duct	0,00	3,50	0,024
Main pancreatic duct	0,00	3,50	0,020

Based on table 1 it is known that there is an increase in anatomic information in the pancreatobiliary organ system gall bladder, common bile duct and main pancreatic duct after

administration of blitung banana as negative oral contrast agent on magnetic resonance cholangiopancreatography examination, which is indicated by an increase in mean rank positive.

Table 2 Wilcoxon test results of the effect of giving blitung banana to the signal intensity of the gastrointestinal system

Anatomy	Mean Rank		p value
	Negative Ranks	Positive Ranks	
Stomach	0,00	3,00	0,038

Based on table 2 it can be seen that there is a decrease in the signal intensity of the gastrointestinal system of the stomach organs after giving blitung banana as negative oral contrast agent on magnetic resonance cholangiopancreatography examination which is indicated by an increase in the mean rank positive.

DISCUSSION

The reduced intensity of the gastrointestinal system signals to the stomach organs after 5 minutes of the administration of the blitung banana makes the pancreatobiliary system appear brighter (hyperintens) and more sharply demarcated. This is because the iron and manganese content in blitung banana can help shorten the relaxation time of T2 fluids so that the signal intensity of the

gastrointestinal system can be eliminated so as not to interfere with the pancreatobiliary system. The mineral content of iron and manganese in blitung banana is used in the examination of magnetic resonance cholangiopancreatography because it has superparamagnetic and paramagnetic properties. The 200 grams of blitung banana used contained 1.01 mg of iron and 1.51 mg of manganese.

Govindarajan in his research mentioned that using dates syrup with iron content of 2.6 mg/dl and manganese 0.3 mg/dl can reduce the signal of fluids in the digestive tract [18].

CONCLUSION

Based on the results of the study it is known that the administration of blitung banana can improve the anatomical information of magnetic resonance cholangiopancreatography images in the pancreatobiliary organ system gall bladder, common bile duct, main pancreatic duct and can help reduce the signal intensity of the gastrointestinal system in the stomach organs.

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