International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN: 2347-6567

IJAMSCR |Volume 8 | Issue 3 | Jul - Sep - 2020
www.ijamscr.com

Research article *Medical research*

Benefits of Steeping Black Tea as a Negative Contrast Medium on CT Urography Examination

Sagita Yudha*, Suharyo Hadisaputro, Jeffri Ardiyanto, Rini Indrati, Donny Kristanto Mulyantoro, Siti Masrochah

Postgraduate Program, Master of Applied Diagnostic Imaging, Semarang Health Polytechnic, Indonesia

***Corresponding author: Sagita Yudha**
Email: sagitayudha@atro.unbrah.ac.id

ABSTRACT

The use of water as a contrast medium requires large amounts of water to fill the lumen of the Urinary Tractus and more water is reabsorbed by the body than is secreted into urine. Steeping Black tea contains Caffeine which is able to increase blood flow in the kidneys thus inhibiting the process of absorption of Na, Ca and Mg causing stimulation of the kidneys to increase the amount of urine production. The purpose of this study is to prove that drinking black tea can increase urine production as a negative contrast medium to see differences in the distension and density of the Urinary Tract on CT Urography examination. This type of research uses True Experimental with Pretest-Posttest Control Group Design research design. Patients selected by Simple Random Sampling. Analysis: Paired t test and Independent t test. The results of the study of the use of 600 ml steeping Black Tea as a negative contrast medium on CT Urography examination did not show the difference in mean difference between the left renal Pelvis p value 0.956, Left UVJ 0.640, Right UVJ 0.935 while on the right renal Pelvis p value 0.001 showed differences in mean difference between the left renal Pelvis p value 0.956, Left UVJ 0.640, Right UVJ 0.935 while on the right renal Pelvis p value 0.001 intervention and control group. The result of measurement of the p value of the density of Vesica urinaria was p value 0.678. Conclusion: Black tea can be used as a negative contrast medium on CT Urographic examination but when compared with mineral water it does not show a significant difference.

Keywords: CT scan Urography, Distention, Density, Mineral water, Black Tea steeping

INTRODUCTION

Report on the results of health data research issued by the Ministry of Health of the Republic of Indonesia in 2018 with the prevalence of patients in Indonesia who have kidney disease (per mile) ≥ 15 years based on doctor's examination of 3.8%. This result increased by 1.8% compared to 2013 health data research by 2%[1]

MSCT (Multislice Computerized Tomography) is a seventh generation CT scan that is equipped with several detector lines to make images into many slices up to 128 slices per round tube. MSCT is able to improve scanning, minimize inspection time and provide better image quality. The advantage of MSCT lies in the large number of detector lines capable of capturing X-rays and forming more image slices[2]. CT scan Urography is one of the diagnostic tests to comprehensively evaluate the function of the urinary tract including the kidneys, ureters and Vesica Urinaria, especially in uretrolithiasis, nefhrolhitiasis, hematuria and congenital abnormalities in the kidney.[3]

To get the optimal CT Urographic images, positive or negative media contrast is used. One of the positive contrast

media used is iodine. The use of iodine contrast media has contra indications for patients who have kidney failure, because it causes the workload of the kidneys to become heavier. Patients sometimes have a phobia effect on the use of syringes when injecting contrast media intravenously. In addition, the use of iodine media contrast increases the burden of costs that are far more expensive.[4]

One technique used in CT Urography examination is the use of reconstruction tracking. This technique is very helpful in diagnosing abnormalities on CT scan of the abdomen without contrast being able to provide optimal results for evaluating the image of the urinary tract as a whole, starting from the kidneys (renal parenchyma, renal pelvic), ureters (proximal, distal ureters) and bladder.[5]

The use of reconstruction tracking on plain CTU is able to provide optimal results by using a diuretic drug, furosemide. Furosemide serves to accelerate the increase in urine volume as a negative contrast media. Examination is carried out in the pre-diuretic and post-diuretic phases, making it easier to track to see the difference in distension and degree of density of the Urinary Tractus.[6] furosemide is a chemical-based diuretic, which is worried that it will increase the workload of the kidneys, especially in patients with kidney disease. The use of furosemide has contra indications such as kidney failure, hepatic coma, hypokalemia and impaired renal or hepatic function.

Besides chemical-based Furosemide, there are natural ingredients that have the same diuretic effect in increasing urine production, namely Black Tea. Black tea contains caffeine which can increase blood flow in the kidneys so that it inhibits the process of absorption of Na, Ca and Mg causing stimulation in the kidneys to increase the amount of urine volume.[7] Several studies have also shown the effect of Caffeine can increase the amount of urine production due to stimulation of the detrusor muscle in the Vesica Urinaria.[8] Consuming black tea has an effect on increasing acute blood pressure. An increase in blood pressure causes blood to become thinner so that absorption in the kidneys and the body's fluid balance becomes disrupted. An increase in urine production occurs.[9]

MATERIALS AND METHODS

This type of research uses True Experimental with a pretest-posttest control group design research design. This research is to analyze, see and evaluate the extent to which Black Tea is able to increase urine production as a negative contrast material on CT Urographic examination. The use of Black Tea as an herbal ingredient as an alternative to substituting medicinal chemicals in CT Urography. The part that will be examined is the Pelvis renalis, Ureter and Vesika Urinaria.[10]

This study provides treatment (Posttest) of the experimental group and compares with the control group. Scanning is done before (pretest) and after treatment (posttest) by drinking a 600 ml solution of steeping Black Tea. Black Tea with a dose of 3 packs of tea bags with a weight of 1.85 grams per bag in 600 ml of hot mineral water with a temperature of 80^0-100^0 C. Measurement of distension using the Measured Distance software on the renal pelvic organs and ureters. After that, the Region of Interest (ROI) software will measure the urinary Vesika measurement to determine the density value.

After measuring the data, it is processed using SPSS software version 22. Data analysis is performed by using the Independent t-test statistical test.

RESULTS AND DISCUSSION

Respondent characteristics based on age, the intervention group mostly in the age range 51-60 years, while the large population of the control group shows the age range 30-50 years. 5 people with female sex and 11 people with male sex. Table 1 to 3

Table 1: Analysis of difference in density before drinking black tea and drinking mineral water

	Variable	Intervention	control	*p-value**
		Mean±SD	Mean±SD	
Density	Vesica Urinaria	1,33±8,87	10,25±13,44	0,115

**Independent T-Test*

The p value of Vesica Urinaria is > 0.05 so there is no difference in density before treatment between the black tea steeping group and the mineral water group.

Table 2: Analysis of density differences after drinking black tea and drinking mineral water

	Variable	Intervention	Kontrol	*p-value**
		Mean±SD	Mean±SD	
Density	Vesica Urinaria	-2,00±6,58	6,31±11,01	0,088

**Independent T-Test*

The Vesica Urinaria p-value is > 0.05 so there is no difference in density after treatment between the intervention group and the control group.

Table 3: Analysis of difference in mean difference in density before and after drinking black tea with mineral water

	Variable	Intervention	control	*p-value **
		Mean±SD	Mean±SD	
Density	HU Vesica Urinaria	-3,33±1,07	-3,93±3,85	0,678*

**Independent T-Test*

The p-value of the intervention group and the control group on all variables was > 0.05, so there was no difference in the difference in density of Vesika Urinaria between drinking black tea and mineral water.

To assess and evaluate the urinary tract, urine is needed to fill the ureter to see the difference between the density of the surrounding organs. To establish a diagnosis of urinary tract stones by using positive contrast media. The use of positive contrast media will cover stones that have also high HU values. Patients with hydronephrosis and hydroureter without furosemide are given in the renal pelvis and the ureter contains more urine whose density is lower than the renal pelvis and ureteral lumen, compared with the normal renal pelvis and ureter.

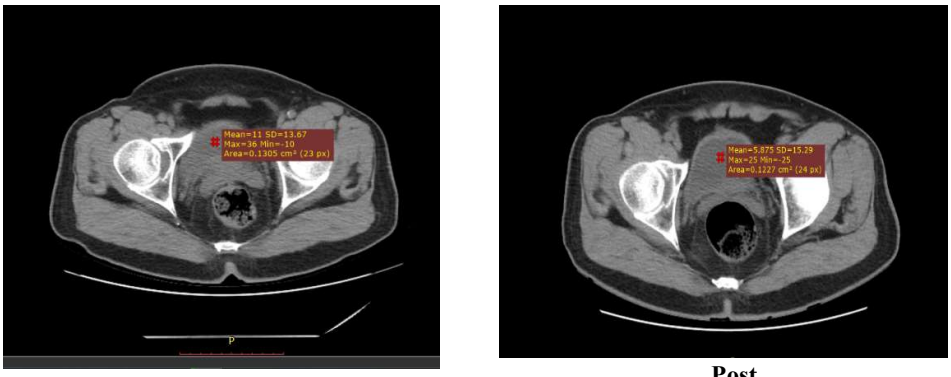
Provision of furosemide to increase urine production in the ureter so that it is easy to see if there are abnormalities in the urinary tract. Using furosemide by mouth is effective, quickly causes diuresis effect so that urine becomes more produced by the kidneys. The urine produced in filling the urinary tract is used as a negative contrast medium. Increasing the amount of urine that fills the ureteral lumen to the Vesica Urinaria causing a decrease in the value of the density of the urinary tract.[6]

This research is by measuring the density value in the Vesica Urinaria urine. The study was conducted by giving 600 ml of black tea solution with 600 ml mineral water control variable. The results of the Independent T-Test statistical test before being given the p-value treatment of the intervention group and the control group of all variables were > 0.05, so there was no difference in the density of urine vesika before being treated before drinking mineral water and drinking black tea steeping.

The difference in mean difference between the treatment group and the control group after drinking mineral water and black tea steeping results of the statistical test showed a p value > 0.05, meaning that there was no difference in density values between the intervention group and the control group. Based on the results of the study showed that black tea did not show differences in the density of urine urine between the groups given steeping black tea and the groups given mineral water. As a negative contrast medium black tea can be used in CT urography examination but when compared to mineral water with the same amount in statistical tests do not show significant differences.

Increasing the amount of urine that fills the lumen in the urinary tract to increase enhancement of the surrounding organs. The amount of urine that fills the urinary tract helps to improve contrast resolution to the surrounding organs and helps to detect abnormalities such as nephropielography.[11]

The more amount of urine produced by the kidneys that fills the ureteral lumen to the urinary Vesica Urinaria will reduce the density value in the urinary tract as a whole. This decrease in density results in a difference in density in the surrounding organs, which helps to evaluate urinary tract abnormalities such as stones to assess and diagnose the doctor's diagnosis of stone abnormalities in the urinary tract. To see a significant difference it is necessary to consume steeping Black tea in more quantities so that the urine produced becomes more maximal. Fig 1



Pre **Post**

Fig 1 Comparison of HU values in patients drinking tea

CONCLUSIONS AND RECOMMENDATIONS

Use of 600 ml Black Tea steeping as negative contrast media on CT Urographic examination using MSCT 128 Slice, shows: There is a decrease in the value of urine urinary density, when compared between the control and intervention groups did not show statistically significant results. An increase in urine drinking black tea brew production compared to mineral water but did not show significant results

ACKNOWLEDGEMENTS

On this occasion I would like to thank all those who have helped in making this journal, especially families who always give encouragement and prayer. Thank you to your health master and supervisor for taking the opportunity to be accepted. The author expects that this Journal can be useful for the educational environment of Semarang Health Polytechnic of the Ministry of Health, particularly Postgraduate Program of Master of Applied Diagnostic Imaging, and for all parties who read it in general.

REFERENCES

1. Ministry RH. Main Results Report. 2018. doi:10.1177/109019817400200403
2. Thiruchelvam N, Mostafid H, Ubhayakar G. Planning percutaneous nephrolithotomy using multidetector computed

tomography urography, multiplanar reconstruction and three-dimensional reformatting. *British Journal of Urology*. 2005;95(9):1280-1284. doi:10.1111/j.1464-410X.2005.05519.x

3. Zeikus E, Sura G, Hindman N, Fielding JR. Tumors of Renal Collecting Systems, Renal Pelvis, and Ureters: Role of MR Imaging and MR Urography Versus Computed Tomography Urography. *Magnetic Resonance Imaging Clinical. North American Journal*. 2019;27(1):15-32. doi:10.1016/j.mric.2018.09.002
4. Prando A. Kidney and urinary tract imaging: Triple-bolus multidetector CT urography as a one-stop shop-protocol design, opacification, and image quality analysis: *International Brazilian Journal Urologi.* 2010;36(4):506. doi:10.1590/S1677-55382010000400019
5. Sulaksono N, Ardiyanto J. Image Optimization of Urinary Tractus Using Slice Thickness Variation. Journal of Health Research 2016;5(1):30-34.
6. Fa M, Anwar MC, Indrati R, Santoso AG. Utilization of furosemide to increase urine production as a negative contrast media in CT urography. *I nternational Journal of Allied Medical Sciences and Clinical Research* 2018;6(3).
7. rya LA, Myers DL, Jackson ND. Dietary Caffeine Intake and the Risk for Detrusor Instability : A Case-Control Study. *American College of Obstetricians and Gynecologists.* 2000;96(1):85-89.
8. Amczar WAGR, Orczala KRZW. Influence of Sodium Fluoride and Caffeine on the Kidney Function and Free-Radical Processes in that Organ in Adult Rats. *Biological Trace Element Research.* 2006;109:35-47.
9. Maughan RJ, Griffin J. Caffeine ingestion and fluid balance : a review. *Journal of Human Nutrition and Dietetics.* 2003;i:411-420.
10. Fauzi A, Manza M, Putra A, Nefrolitiasis. Orthopedic surgery Faculty of Medicine, University of Lampung. 2016;5(April):69-73.
11. Sternberg KM, Perusse K. CT Urography for Evaluation of the Ureter. *RadioGraphics:May-June.* 2015

How to cite this article: Sagita Yudha, Suharyo Hadisaputro, Jeffri Ardiyanto, Rini Indrati, Donny Kristanto Mulyantoro, Siti Masrochah. Benefits of steeping black tea as a negative contrast medium on CT urography examination. Int J of Allied Med Sci and Clin Res 2020; 8(3) :647-650

Source of Support: Nil. **Conflict of Interest:** None declared.