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ORIGINAL RESEARCH

EVALUATING THE PSYCHOLOGICAL EFFECTS OF CORONARY CT ANGIOGRAPHY TESTING AND RESULT DISCLOSURE

Dr Yatish Saxena[1], Narendra Singh Chandel[2], Dr Sameer Raghuwanshi[3] Dr Rimjhim Sahu[4]

[1]Assistant Professor, [2]Associate Professor, Department of Radiology, Mahaveer Institute of Medical Sciences Bhopal,[3]Consultant Radiologist, Bhopal,[4]Associate Professor Pharmacology PCMS & RC Bhopal.

Corresponding Author

Dr Rimjhim Sahu ,

Associate Professor Pharmacology PCMS & RC Bhopal.

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Abstract

Background: Chest pain is often the herald of cardiovascular disease and is one of the most common diagnostic challenges encountered by practicing clinicians. Coronary computed tomographic angiography (CTA) is an anatomic test that can be used in intermediate-risk patients to provide a diagnostician with these answers quickly. Hence; the present study was conducted for evaluating psychological impact of test results following diagnostic coronary CT angiography.

Materials & methods: A total of 30 nonacute cardiac patients were enrolled for diagnostic coronary CT angiography. A Performa was made and complete clinical and demographic details of all the patients was obtained. A questionnaire was developed and was filled by all the subjects prior to testing and following the receipt of test results, at which point illness perceptions and intentions to take cardiac medication, as well as diet and exercise intentions were measured. Changes on these variables were then compared between patients diagnosed with normal arteries and patients diagnosed with diseased arteries. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results: While assessing the illness psychological perception before and after coronary CT angiography among normal arteries at two different time intervals, significant results were obtained. However; while assessing the illness psychological perception before and after coronary CT angiography among diseased arteries at two different time intervals, non-significant results were obtained.

Conclusion: From the above results, the authors concluded that Coronary CT angiography impacts psychologically on individuals in many significant ways.

Key words: Coronary CT angiography, Psychological

INTRODUCTION

Chest pain is often the herald of cardiovascular disease and is one of the most common diagnostic challenges encountered by practicing clinicians. Cardiovascular disease remains a leading cause of morbidity and mortality worldwide, despite advances in medical and procedural therapies. Coronary artery disease (CAD) is an important subset of cardiovascular disease that requires timely, accurate, and cost-effective diagnosis. Coronary computed

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tomographic angiography (CTA) is an anatomic test that can be used in intermediate-risk patients to provide a diagnostician with these answers quickly.[1, 2]

The diagnosis of CAD is guided by several invasive and non-invasive imaging modalities that look for evidence of decreased myocardial perfusion, impaired myocardial contractility, and other anatomical changes. Coronary angiography (CAG) is considered the gold standard in the diagnosis of CAD, as it is both diagnostic and therapeutic. However, CAG can be considered an unfavorable diagnostic option because this invasive procedure is associated with high costs and several periprocedural risks, including access site complications such as hematoma, hemorrhage, active extravasation, arteriovenous fistula, and pseudoaneurysm and catheter-related complications such as cholesterol embolism, local vascular injury, and dissection.[3, 4]

Despite the wide use of coronary angiography and the potential effect it may have on patients' views of their health, very little is known about the psychological impact of the procedure. Angiography is potentially a psychologically significant event, as patients' fears about the outcome of their symptoms may either be confirmed or allayed after receiving the results of the procedure. Angiogram results also have implications for future treatments (e.g., surgical interventions), which may need to be considered following testing.[5, 6] Angiogram results also have implications for future treatments (e.g., surgical interventions), which may need to be considered following testing.[7] Hence; the present study was conducted for evaluating psychological impact of test results following diagnostic coronary CT angiography.

MATERIALS & METHODS

The present study was conducted for evaluating psychological impact of test results following diagnostic coronary CT angiography. A total of 30 nonacute cardiac patients were enrolled for diagnostic coronary CT angiography. A Performa was made and complete clinical and demographic details of all the patients was obtained. A questionnaire was developed and was filled by all the subjects prior to testing and following the receipt of test results, at which point illness perceptions and intentions to take cardiac medication, as well as diet and exercise intentions were measured. Changes on these variables were then compared between patients diagnosed with normal arteries and patients diagnosed with diseased arteries. Anxiety was measured at baseline using the six-item short form of the State– Trait Anxiety Inventory (STAI) scale. The Brief Illness Perception Questionnaire (Brief IPQP) was used to assess the range of patients' illness beliefs at baseline and immediately following diagnostic consultation. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

RESULTS

Out of 30 patients, 14 patients had normal arteries while 16 patients had diseased arteries. Mean total cholesterol among normal and diseased arteries group was 5.42 mmol/L and 5.39 mmol/L. Mean HDL cholesterol among normal and diseased arteries group was 1.59 mmol/L and 1.51 mmol/L. Mean LDL cholesterol among normal and diseased arteries group was 3.32 mmol/L and 3.21 mmol/L. While assessing the illness psychological perception before and after coronary CT angiography among normal arteries at two different time intervals, significant results were obtained. However; while assessing the illness psychological perception before and after coronary CT angiography among diseased arteries at two different time intervals, non- significant results were obtained.

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Table 1: Clinical and health behavior at baseline

Biochemical variables	Coronary CT angiography diagnostic group		p-value
	Normal arteries (n=14)	Diseased arteries (n=16)	
Total cholesterol (mmol/L)	5.42	5.39	0.12
HDL cholesterol (mmol/L)	1.59	1.51	0.37
LDL cholesterol (mmol/L)	3.32	3.21	0.46
Smoking history (n)	8	10	0.96

Table 2: Illness psychological perception before and after coronary CT angiography among normal arteries

Illness perception variable	Normal arteries				
	T1	T2	T1-T2	95% CI	p-value
Illness identity	1.96	1.29	0.67	0.02 to 1.53	0.45
Illness emotion	4.23	3.01	1.22	0.23 to 2.56	0.00*
Illness consequences	6.02	4.01	2.01	0.58 to 3.45	0.00*

*: Significant

T1: Measurement at baseline; T2: Measurement immediately following diagnostic consultation;

Table 3: Illness psychological perception before and after coronary CT angiography among diseased arteries

Illness perception variable	Diseased arteries				
	T1	T2	T1-T2	95% CI	p-value
Illness identity	1.62	1.83	-0.21	-1.23 to 0.38	0.12
Illness emotion	3.08	3.15	-0.07	-1.08 to 0.62	0.28
Illness consequences	6.12	6.01	0.11	0.39 to 0.76	0.62

*: Significant

DISCUSSION

Before Multi-Detector Computed Tomography (MDCT), the main barriers to the clinical implementation of CT angiography (CTA) were acquisition speed and both spatial and temporal resolution. Imaging of any vascular bed requires rapid volume coverage coupled with the ability to resolve disease in small diameter contrast opacified vessels. One extreme for volume coverage is CTA for peripheral artery disease (PAD); imaging speed is mandated by blood velocity, on the order of 30-180 mm/sec from the abdominal aorta to the feet. The CT acquisition must be synchronized with the contrast bolus throughout a large craniocaudal, or z-axis, field of view (FOV).[7- 10] Hence; the present study was conducted for evaluating psychological impact of test results following diagnostic coronary CT angiography.

Out of 30 patients, 14 patients had normal arteries while 16 patients had diseased arteries. Mean total cholesterol among normal and diseased arteries group was 5.42 mmol/L and 5.39 mmol/L. Mean HDL cholesterol among normal and diseased arteries group was 1.59 mmol/L and 1.51 mmol/L. Mean LDL cholesterol among normal and diseased arteries group was 3.32 mmol/L and 3.21 mmol/L. Devcich DA et al examined these effects in relation to illness perceptions, cardiac health behavior intentions, and subsequent health behaviors. Forty-five nonacute cardiac patients who were referred for diagnostic coronary CT angiography completed questionnaires prior to testing and following the receipt of test results, at which point illness perceptions and intentions to take cardiac medication, as well as diet and exercise intentions were measured. Compared to positive-testing patients, patients with normal test results reported significant changes toward more positive illness perceptions

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following testing, with improvements in emotional effect of illness, illness concern, consequences, and personal control of illness. The illness perception of treatment control was seen as more important among positive-testing patients, whereas both groups reported increases in illness coherence. Health behavior intentions increased for positive-testing patients only, as did physical activity at follow-up. Diagnosis-dependent psychological effects can be detected following coronary CT angiography.[11]

While assessing the illness psychological perception before and after coronary CT angiography among normal arteries at two different time intervals, significant results were obtained. However; while assessing the illness psychological perception before and after coronary CT angiography among diseased arteries at two different time intervals, non-significant results were obtained. In another previous study conducted by Devcich DA et al, authors soughted to explore patients' reactions to an angiogram in terms of changes in symptom appraisal, perceived consequences of their condition, and patients' illness concern and emotional response to their condition after the receiving diagnostic results. The Brief IPQ was administered to patients undergoing a diagnostic coronary angiogram (N=57) before and immediately following the procedure. Changes in illness representations were then compared between patients diagnosed with diseased arteries and patients with normal arteries. They found that the number of symptoms patients associated with their condition, illness consequences, and illness emotion decreased for patients receiving normal results but remained unchanged for patients receiving results showing diseased arteries. Illness concern decreased significantly for both patient groups. The results demonstrated that diagnostic results can have clear and immediate effects on how patients' view and emotionally respond to their symptoms.[12] In another previous study conducted by Ohana M et al, authors evaluated the prevalence, severity, and impact of scanxiety on quality and interpretability of Coronary CTA. 366 consecutive patients were prospectively presented with a clinical questionnaire comprising two tests to evaluate their scan-related anxiety: the Impact of Event IES-6 (6 questions, final score 0-24) and a visual stress-scale (1 question, score 1-10). 344 patients completed the questionnaire. 74.1% reported some scan-related distress, with a mean IES-6 score of 4.1 ± 4.3. There was no significant difference in terms of age, sex or indications for Coronary CTA between the non-anxious (IES-6 = 0) and the anxious (IES-6>0) patients. There was no significant independent correlation between image quality and IES-6 score, nor between IES-6 score and heart rate variability. The prevalence of scan-related anxiety - aka scanxiety - in Coronary CTA patients is high (74.1%) but does not appear to impact image quality and interpretability.[13]

CONCLUSION

From the above results, the authors concluded that Coronary CT angiography impacts psychologically on individuals in many significant ways.

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