

# Computed Tomography-Based SYNTAX Score: A Case Report

## *Bilgisayarlı Tomografiye Dayalı SYNTAX Skoru: Bir Vaka Takdimi*

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### Abstract

The SYNTAX score is an angiographic scoring system that is currently used for evaluating the complexity of coronary lesions. Its efficiency in both long-term prognosis and the selection of treatment modalities has been shown in many studies. However, there is little evidence for the use of this scoring system in CT angiography, which has become a part of coronary artery disease practice. Here, we showed that the SYNTAX score could be used in a feasible way in CT angiography.

**Key Words:** Coronary angiography, CT angiography, SYNTAX score

### Özet

Syntax skoru, koroner lezyon kompleksitesinin değerlendirilmesinde kullanılan bir anjiyografik skorlama sistemidir. Bu skorun hem uzun dönem prognozun hem de tedavi yönteminin seçilmesinde etkinliği pek çok çalışmada gösterilmiştir. Ancak, koroner arter hastalığı pratiğinin bir parçası haline gelmeye başlayan BT (Bilgisayarlı tomografi) anjiyografideki kullanımı konusunda çok az kanıt vardır. Biz, bu vakada, syntax skorunun BT anjiyografide uygulanabilir olduğunu gösterdik.

**Anahtar Kelimeler:** Koroner anjiyografi, BT anjiyografi, SYNTAX skoru

### Introduction

The SYNTAX score is a currently used angiographic scoring system for evaluating the complexity of coronary lesions. Its efficiency in both long-term prognosis and the selection of treatment modalities has been shown in many studies. CT angiography has been increasingly used in the assessment of coronary arteries, and there is extensive evidence that CT angiography is useful in diagnostic and prognostic aspects. However, there is little evidence for the use of this scoring system in CT angiography.

### Case Report

A 66-year-old male presented to our clinic with approximately 2 years of chest pain that worsened within the previous 3 days. He had a history of type 2 diabetes for 10 years and hypertension for 8 years. He was being treated with oral anti-diabetic drugs, ramipril (10 mg) and acetyl salicylic acid (150 mg). Transthoracic echocardiography revealed moderate hypokinesis in most of the anterior wall, and the patient was hospitalized for coronary angiography. However, because the patient refused an invasive procedure, he underwent com-

puted tomography (CT) angiography. He was again offered coronary angiography due to severe chest pain refractory to medical treatment after 4 hours of CT angiography, and the patient underwent coronary angiography after his acceptance. The patient's SYNTAX score and SYNTAX score parameters calculated from both CT angiography and conventional angiography are summarized in Table 1 and Figures 1 and 2.

### Discussion

In this case report, we demonstrated that the SYNTAX score, which has been successfully used in the assessment of the severity and complexity of coronary lesions in conventional angiography, could also be used in CT angiography in a similar manner.

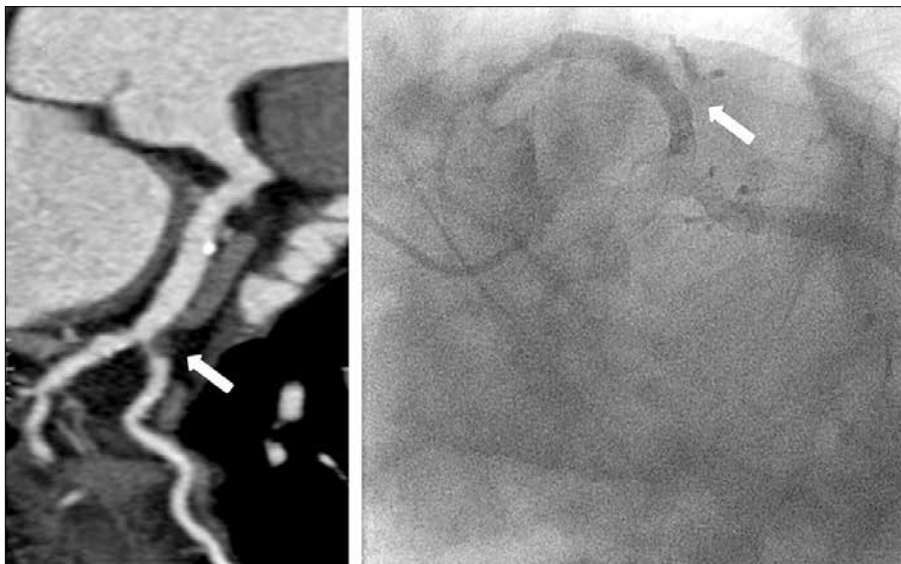
The SYNTAX score is an angiographic scoring system that was developed by SYNTAX trial (Synergy between PCI with Taxus and Cardiac Surgery) researchers in 2005 to rank the anatomic severity and complexity of coronary lesions [1]. The popularity of the SYNTAX score has been steadily increasing in the selection of treatment strategy for complex coronary artery disease and in clinical decision making. Each coronary lesion included in the scoring system must produce  $\geq 50\%$

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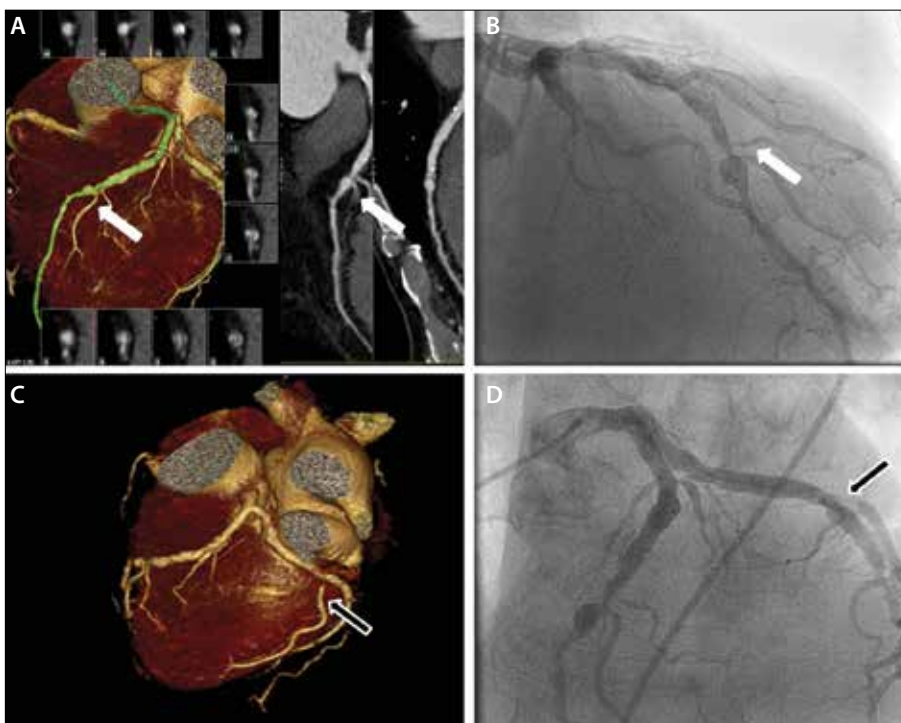
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**Figure 1.** Critical coronary stenosis of the first diagonal artery on both conventional and CT angiography.



**Figure 2.** A, B) Critical coronary stenosis of the mid-left anterior descending artery on both conventional and CT angiography. C, D) Critical coronary stenosis of the second circumflex artery on both conventional and CT angiography.

diameter stenosis in vessels  $\geq 1.5$  mm. Then, the total score is calculated based on the analysis of variables, such as the number of total lesions, dominance, bifurcation lesions, aorto-ostial lesions, diffuse disease/small vessel disease, long lesions, thrombotic- calcific lesions, and tortuosities. This

scoring system is based on the principle of the visual assessment of anatomic features of coronary lesions via coronary angiograms [1]. Due to its visual component, it has some limitations. However, studies related to the reproducibility of the SYNTAX score revealed that it has moderate reproduc-

**Table 1. Comprehensive analysis of the SYNTAX score of the case with both conventional and CT angiography**

|  | CT angiography                       | Conventional angiography     |
|--|--------------------------------------|------------------------------|
| Dominance                                | Right                                | Right                        |
| Number of total lesions and localization | 4 lesions                            | 3 lesions                    |
|  | *LAD mid, Cx-OM2, Cx-OM3, Diagonal-1 | *LAD mid, Cx-OM2, Diagonal-1 |
| CTO                                      | -                                    | -                            |
| Bifurcation lesion                       | Yes (all)                            | Yes (all)                    |
| Aorto-ostial lesion                      | -                                    | -                            |
| Long lesion                              | Yes (LAD mid)                        | Yes (LAD mid)                |
| Heavy calcification                      | -                                    | -                            |
| Tortuous vessel                          | -                                    | -                            |
| Thrombotic lesion                        | -                                    | -                            |
| Diffuse/small vessel disease             | -                                    | -                            |
| SYNTAX score                             | 24                                   | 17                           |

ibility and could be used in clinical practice [2]. The SYNTAX score has been shown to be useful in both the selection of the appropriate diagnostic strategies and the estimation of the prognosis in complex coronary artery disease [3, 4].

The SYNTAX score was initially defined with conventional angiography, and all of the studies related to its diagnostic and prognostic importance have been performed with conventional angiography. Recently, CT angiography has been increasingly used in the assessment of coronary arteries, and there is extensive evidence that CT angiography is useful in diagnostic and prognostic aspects [5, 6]. In contrast to conventional angiography, there is no scoring system that grades the complexity of coronary lesions in CT angiography. Stahli et al. [7] reported that the CT-based SYNTAX score was correlated with the conventional angiography-based SYNTAX score; however, the authors did not perform a comprehensive analysis of the SYNTAX score parameters. Moreover, the analyses related to agreement/disagreement were not reported. In this case report, we propose that the CT-based SYNTAX score is compatible with the conventional angiography-based SYNTAX score. Moreover, similar results were obtained in the analysis of SYNTAX score parameters, except for the number of total lesions. However, for more comprehensive information, a detailed analysis should be performed on the agreement between the CT-based SYNTAX score and conventional angiography-based SYNTAX score.

In conclusion, we have demonstrated that the SYNTAX score used in conventional angiography could also be used

in CT angiography in a similar manner. However, extensive research on this subject is needed.

**Conflict of interest statement:** The authors declare that they have no conflict of interest to the publication of this article.

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