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Original Article

# SYNTAX RESIDUAL COMO PREDICTOR DE EFECTOS ADVERSOS POST ANGIOPLASTIA PERCUTANEA, SEGUIMIENTO A 3 AÑOS

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***ABSTRACT***

***Introduction:*** *The Syntax Residual Score (SRs) is the calculation of the SYNTAX SCORE I (SS) score after revascularization, the cut point between high and low, has been agreed upon in 8 points.*

***Material and methods:*** *We carried out a retrospective longitudinal cohort study in our center, calculating SRs after coronary angioplasty in 52 patients, with implantation of drug-eluting stents, with 8 points as cut-off point, clinical follow-up was performed at 3 years; It is divided into two groups, group 1 (SR <8), group 2 (SR> 8) finding the following; mortality 0% group 1, 3.8% group 2 with a value of p = 0.017, events of Acute Coronary Syndrome 0% group 1, 9.6% group 2, p = 0.001, Need to repeat revascularization (TVR), 1.9% group 1, 17.3% group 2, p = 0.002.*

***Conclusions:*** *SR calculation is a useful quantitative tool to determine whether revascularization is complete or incomplete, with the latter existence a statistically significant association between residual syntax score of less than 8 points, mortality, presence of acute coronary syndrome and need to repeat revascularization coronary disease at 3 years of follow-up, that is, it has a long-term prognostic value. Currently, we suggest that a functional anatomical evaluation of coronary lesions be carried out to guide the intervention and use intravascular methods to optimize results and affect the rate of adverse events.*

**Keywords:** *Complete, incomplete revascularization, Residual syntax, predictor of adverse events.*

## 1. INTRODUCTION

The SYNTAX Residual was validated, thanks to a study by Farooq et al, who, in the randomized cohort of PCI of the SYNTAX study, calculated the base SYNTAX score and the residual SYNTAX score. Patients with a residual SYNTAX of 0 were considered to have complete revascularization (CR), and a score> 0 as incomplete (1). The 5-year results were stratified into complete revascularization and incomplete revascularization into tertiles of residual SYNTAX (> 0-4, 4-8 and> 8 points). In this cohort, the mean baseline SYNTAX was 28.4 ± 11.5 points, and the Residual SYNTAX was 4.5 ± 6.9 points. A progressively larger SYNTAX Residual has been shown to be a predictor of clinical comorbidity and anatomical complexity. In this analysis, it was documented that subjects with CR or residual SYNTAX <8 points had a comparable 5-year

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mortality (CR, 8.5%; SYNTAX Residual> 0–4, 8.7%;> 4–8, 11.4%; P = 0.60) (2). Patients with a score less than or equal to 8 points had a mortality comparable with patients with complete revascularization. However, patients with a residual score> 8 had an all-cause mortality of 35.3% (P <0.001) (36). According to this study, incomplete revascularization increased the risk of any of the events studied at 5 years, such as mortality, heart attack, and reoperation. In the analysis of some subgroups such as; Diabetics, left coronary artery trunk disease, low LVEF or chronic total obstruction, the results were not different (3). As a conclusion to this analysis, the Residual SYNTAX turned out to be a powerful indicator of mortality, and this scale also helps us determine the degree of revascularization objectively.

As has been determined in the different studies analyzed, there is a clear trend of better results when a "complete coronary revascularization" is performed, be it anatomical or functional. the presence of residual syntax greater than 8 points is associated with a greater number of long-term adverse outcomes. According to this conclusion obtained from various international studies, it is necessary to validate this assertion in patients revascularized by percutaneous coronary intervention, hoping that; the higher the residual Syntax score (greater than 8, as a cut-off point), the higher the number of adverse outcomes is expected in a 3-year follow-up.

## 1. METHODOLGY

Patients undergoing percutaneous coronary intervention as a coronary revascularization technique. Patients undergoing PTCA who had a history of previous coronary artery bypass surgery were excluded. Patients in whom clinical follow-up could not be carried out, OR the 3-year follow-up was not completed, were eliminated. The independent variable was the residual SYNTAX scale score (it is the numerical calculation of the SYNTAX scale, after having performed the revascularization by percutaneous coronary intervention) (Sr). The independent variables; Mortality, presence of Acute Coronary Syndrome and the need to repeat revascularization. A review of the electronic records of patients undergoing PCI was carried out in 2013. Demographic and procedural variables were collected from the patients undergoing PTCA. They were calculated and stratified with the residual Syntax scale. They were classified into two groups; Group 1 if it is less than 8 points, Group 2 if it is greater than or equal to 8 points. Follow-up was carried out through the electronic file, in search of adverse outcomes at 3 years. Descriptive statistics were performed, with analysis of measures of central tendency and standard deviation for; age, risk factors, such as systemic arterial hypertension, diabetes mellitus, dyslipidemia, and smoking. Median numbers of drug-eluting stents implanted.

In both groups, a Pearson R correlation was performed for each dependent variable, mortality, acute coronary syndrome and repeated revascularization, to document that there is a correlation between the residual Syntax and each previously mentioned variable. It is a retrospective investigation, so informed consent was not required.

## 2. RESULTS

A total of 52 patients, who underwent PTCA in 2013, were analyzed and met the inclusion, exclusion and elimination criteria previously described. A clinical follow-up was given for 3 years, where the presence or absence of the dependent variables was documented; mortality, acute coronary syndrome, or repeat revascularization. The age range was 47-77 years, mean 64.3 ± 9.1 years. male sex 40 patients (76.9%), and female 12 (23.1%). Group 1 (residual Syntax <8 points) 38 patients and group 2 (residual Syntax> 8 points) consisted of 14 patients.

**Table 1.** Demographic data

| Datos demográficos | Grupo 1 SYNTAX residual ≤8 N (%) | Grupo 2 SYNTAX residual >8 N (%) | Total N (%) |
|---|---|---|---|
| **Pacientes** | 38 (73) | 14 (23.9) | 52 (100) |
| **Edad (años)** | 63.6 ± 8.7 | 66.2 ± 9 | 64.9 |
| **Sexo masculino** | 30 (78.9) | 10 (71.4) | 40 (80.7) |
| **HAS** | 29 (76.3) | 11 (78.5) | 40 (80.7) |
| **DM2** | 14 (36.8) | 5 (35) | 19 (36.5) |
| **Dislipidemia** | 13 (34.2) | 5 (35.0) | 18 (34.6) |
| **Tabaquismo** | 8 (21.0) | 6 (42.0) | 14 (26.0) |
| **% STENTS medicados** | 84.2 | 78.5 | 81.3% |
| **Score SYNTAX basal (media)** | 21.7 pts. | 31.2 pts. | 26.4 pts. |
| **Score SYNTAX residual (media)** | 1.5 pts. | 14.0 pts. | 15.5 pts. |

Table 2. Results of clinical follow-up at 3 years. Post angioplasty with pharmacological stent

| Resultados | Grupo 1 SYNTAX residual ≤8 N (%) | Grupo 2 SYNTAX residual >8 N (%) | Total N (%) | R Pearson ( valor de p) |
|---|---|---|---|---|
| **Mortalidad** | 0.0 (0) | 2 (3.8%) | 2 (3.8) | 0.33 (0.017) |
| **SICA** | 0 (0) | 5 (9.6) | 5 (9.6) | 0.53 (0.001) |
| **Revascularización repetida** | 1 (1.9) | 9 (17.3) | 10 (19.2) | 0.69 (0.002) |
| **Total** | 1 (1.9) | 14 (26.9) | 15 (28.8) | 1.55 (0.017) |

## 3. DISCUSSION

Syntax score greater than or equal to 8 points is more frequently associated with adverse outcomes at 3 years of follow-up, especially mortality. Validating that the cut-off point is 8 residual Syntax points, these results are comparable to those found in the international literature, thus being a powerful indicator of long-term mortality (4).

Mortality occurred in 2 patients in the clinical follow-up, both patients belonging to group 2. 1 of the patients was given as cause of death type III infarction (sudden death) attributed to death of cardiovascular origin, the other patient presented death due to infarction ST-segment elevation acute myocardium.

The need for repeat revascularization (TVR) at 3 years turned out to be the adverse outcome that is most associated with a residual Syntax score greater than 8, which can be explained by the fact that there are more untreated lesions that will require intervention in the future either through coronary intervention or bypass surgery. Repeated revascularization in clinical follow-up occurred in 10 patients, 1 patient in group 1 and 9 patients in group 2. The presence of acute coronary syndrome in long-term follow-up was associated with a residual Syntax greater than 8. It occurred in 5 patients, all in group 2. Of these events, 2 were classified as unstable angina, 1 as non-ST segment elevation infarction and 2 as ST segment elevation infarction.

The usefulness of the Syntax Residual scale is aimed at determining how complete the revascularization by coronary intervention was, that is, the lower the score, the more complete the revascularization, and this tool is useful in the hemodynamic room, when choosing which lesions are have to be treated and which ones will remain without revascularization, in this way the interventional cardiologist can determine in the ward through the rapid calculation of the score, without any other invasive tool, how complete is their revascularization in an objective way and have a quantitative indicator of the patient's prognosis.

One of the limitations of the present study was the number of patients (n = 52), although this sample showed a statistically significant difference between the two groups analyzed.

A residual Syntax Score greater than 8 points has also been associated with higher co-morbid states; age over 60 years, increased creatinine, low LVEF, presence of chronic Total Occlusion, increasing the risk of mortality from all causes at 5 years by 35%, Myocardial Infarction 17%, Major adverse events in 59%, TVR in 32%, Stent thrombosis in 16%, therefore the Residual Syntax is an independent marker of co-morbid states and long-term mortality (34, 38, 39). This means that there are clinical, anatomical, and functional factors that influence the result of the evaluation of this parameter. Due to the aforementioned, at present it should be emphasized that coronary lesions should be evaluated from an anatomical point of view, but also functional, guide the intervention with intravascular and ischemic imaging, to obtain better results.

The SYNTAX Score II, which combines anatomical findings and clinical variables, has been validated (5).

## 4. CONCLUSIONS

The Syntax Residual scale can help the interventional cardiologist determine a reasonable level of revascularization, and it becomes yet another tool for the physician to improve the patient's prognosis.

It is clear that currently the functional evaluation with Fractional Reserve Flow (FFR) provides a more accurate evaluation of the lesions that merit treatment. Considered by some authors as the gold standard to determine if the lesion produces ischemia and therefore would warrant treatment. Hence the need to develop a score that assesses the level of revascularization, thus emerging the residual SYNTAX Score (SRs), from which two indices have been derived,

1.- Syntax Revascularization Index (SRI): SRI = (1-rSS / baseline SS) X 100 (6).

2.- Residual Syntax Index (rSS): = rSS X modified ACEF score (7).

Then it will be necessary to evaluate the coronary lesions with Syntax I, Syntax II, functional evaluation with FFR to guide the Intervention or myocardial perfusion studies, and the intravascular image to optimize immediate angiographic results, and once the Intervention is completed, calculate the Syntax Score Residual, with 8 points as a cut-off point

(complete revascularization <8 points, incomplete revascularization> 8 points), the Syntax Residual indices, to approximate the long-term prognosis of patients undergoing percutaneous or surgical revascularization.

The European Society of Cardiology highly recommends the SYNTAX Score to determine the type of coronary artery revascularization PTCA or CRC (8). Consequently, the score and index called SYNTAX residual has shown usefulness to quantify and determine the degree of revascularization, which can be complete, with an impact on the prognosis of patients undergoing revascularization (9). Single Photon Emission Computed Tomography to evaluate myocardial perfusion (SPECT), highly recommended by the AHA, has demonstrated its usefulness for predicting cardiac events in patients with known or suspected coronary disease. Very useful for evaluating prognosis post ICP.

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