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Original Article

Approach Protocol for Patients with; Chronic Coronary Syndrome, Aortic Stenosis and Acute Pumonary Thromboembolia, During the Sanitary Emergency due to COVID-19, In the Hospital South-Central Hospital (HCSAE), Pemex, Mexico City.

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ABSTRACT

T*he first reported cases of COVID19 disease were reported in December 2019 in Wuhan, China, with a pandemic quickly establishing. Which is why many of the routine protocols in hospitals, including haemodynamic laboratory rooms, had to be modified. Therefore, this article presents the protocol carried out, during the health contingency, in the PEMEX HCSAE for the management in patients with suspected or confirmed COVID19 disease, which occur in the context of chronic coronary syndrome as well as the procedure management of Structural heart disease (aortic stenosis) and pulmonary thromboembolism.*

Keywords: *COVID 19, thromboembolism, chronic coronary syndrome.*

1. INTRODUCTION:

At the end of the year 2019, a new type of virus (coronavirus) was identified that was identified as the cause of a group of Pneumonia in Wuhan, a city in the Hubei Province of China. Disease that quickly spread resulting in an epidemic through China, due to a high degree of virulence, it spread widely to other countries around the world. In February 2020, the World Health Organization (WHO) designated this disease as COVID-19, subsequently confirming it as a Pandemic.The infection caused by the virus called the SARS-COV2 coronavirus, widely known as COVID-19, not only causes severe lung disease, the virus can directly or indirectly affect other organs of the body, including the cardiovascular system, which causes a great health problem. Although cardiovascular complications are present in patients with COVID-19, even in those without a pre-existing condition in said cardiovascular system, it is being observed that being a carrier of a basic heart problem can condition a higher risk of being a more severe disease due to COVID-19 increasing its case fatality rate. What could be a light to moderate disease, especially in young patients or people considered healthy,

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2. CHRONIC CORONARY SYNDROME

Coronary artery disease is defined as the pathological process characterized by the accumulation of atherosclerosis plaques in the epicardial coronary arteries, whether obstructive or non-obstructive. leading to functional changes in the coronary circulation. It has periods of clinical stability for very variable periods of time, but at any time these plates can be destabilized either by a rupture or erosion and cause an acute coronary syndrome, for this reason, the term Chronic Coronary Syndrome is currently preferred. Currently 6 scenarios are considered compatible with chronic coronary syndrome:

1. Suspected coronary artery disease (CAD) and symptoms of stable angina and / or dyspnea.

2. New onset of heart failure (HF) or left ventricular dysfunction and suspected CAD.

3. Stabilized chronic coronary syndrome less than one year after an acute coronary syndrome or with recent revascularization.

4. Stabilized symptoms greater than one year from initial diagnosis or revascularization.

5. Angina and suspicion of vasospastic or microvascular coronary disease.

6. Asymptomatic with EAC in screening test. (2.3)

Given theContinued need for attention to this pathology during the COVID-19 pandemic forces us to recognize the exceptional situation and seek an articulated response for the care of patients with Stable Chronic Coronary Syndrome (SCCE). To date, and in accordance with the international recommendations of the Cardiology societies, there is general agreement to DIFFER invasive, percutaneous, or surgical procedures in patients with SCCE during the current health emergency that are considered stable or elective (3, 4). The hemodynamic laboratory working group at the Hospital Central Sur de Alta Especialidad(HCSAE) PEMEX, considers the position to be adequate and recommends its adoption, also recognizes that the number of unattended patients will inevitably end up accumulating, and a proportion of these could transform into new cases of acute ischemia. With this information, we propose the deferral of elective procedures that according to the recommendations suggested internationally may correspond to 3 large groups:

1. ICP (Percutaneous Coronary Intervention) in patients with chronic coronary syndrome, with Optimal Pharmacological treatment

2. Endovascular intervention for claudicating ilio-femoral disease, but not disabling, without acute ischemia. Under pharmacological treatment.

3. Stable structural heart disease, such as Aortic Stenosis, Mitral Stenosis, Mitral Regurgitation, Uncomplicated Congenital Heart Disease, such as Interatrial Communication or patent foramen ovale, (4,5)

It should be noted that, according to the same indications, the inclusion or modification of elective procedures may vary according to the specific considerations of each center. That in the case of the HCSAE PEMEX this decision should be considered by the cardiological team.In ambulatory or elective patients of the Hospital Central Sur de Alta Especialidad (HCSAE), Petróleos Mexicanos (PEMEX) in which there is an interventional procedure plan, the procedure will be deferred. In COVID-19 positive patients in the same way, the indication will be deferred. In patients already admitted with negative COVID-19, catheterization and early discharge will be performed or if the hospital has positive COVID-19 patients and there is a high risk of contagion, the patient will be discharged and catheterization will be safely scheduled on an outpatient basis. . Next, we establish the working algorithm of the Hospital Central Sur de Alta Especialidad (HCSAE), Petróleos Mexicanos (PEMEX) and the approach to be followed by elective patients. (6,7)

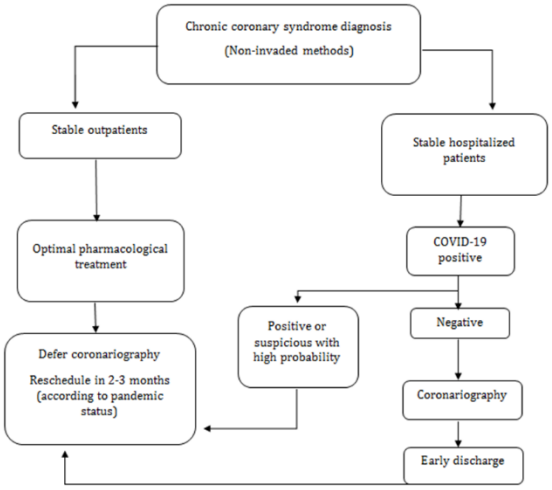


Figure 1: Approach algorithm for elective patients, Chronic Coronary Syndrome.

In summary, patients with SCCE during the pandemic period should receive optimal medical pharmacological treatment and be warned to seek emergency care in case of presenting symptoms of ischemic instability.

3. AORTIC VALVULOPATHY (AORTIC STENOSIS (Aortic Stenosis (AS))

According to the ACC / SCAI (American College of Cardiology / Society for Cardiovascular Angiography and Interventions), the decision to treat patients with structural heart disease must take into account the risk-benefit involved in dedicating resources (they may be limited), the risk of delaying procedures and exposure involving the hospital environment and health personnel. (8.9)

The priorities are: 1) Minimize exposure of patients with structural heart disease and the intervention team itself to coronavirus; 2) Maintain high quality and durable results in structural intervention during the pandemic; 3) Reduce the risk that may involve using the resources that could be used for other needs of patients with COVID-19, that is, an adequate optimization of resources, according to objective evaluations such as the various risk / benefit and fragility Scores of each patient. and 4) Avoid long delays of intervention in patients with high risk of clinical deterioration, heart failure and death.

Next, we describe the different clinical scenarios that can present this pathology, in the time of health emergency, and the recommended behaviors to follow, without forgetting or setting aside the risk scores that should be applied to all cases; STS, logistic EuroScore, ACCTAVR Score, fragility indices such as, Katz, COLUMBIA, FRIED. With said evaluations, a more complete evaluation of each case can be obtained, and in this

way evaluate the risk / benefit of the procedure, (7.9.10) as well as the relationship, clinical risk / anatomical risk, of the procedure technically speaking. In this way then we will have (8);

1. Symptomatic severe AS and altered LVEF or syncope: Consider TAVI (Transcatheter aortic valve implantation) during hospitalization.

In patients with impaired LVEF and HF (heart failure) NYHA III-IV, or syncope secondary to AS (aortic stenosis), the percutaneous strategy should be considered to decrease the risk of clinical deterioration, prolonged hospitalization, or re-hospitalization.

2. Severe symptomatic stable AS: TAVI scheduled on an outpatient basis

It is reasonable according to supplies and stability of the patient, in symptomatic severe aortic stenosis with NYHA II functional class, to defer the procedure until after the pandemic season, which will also be determined by the clinical evolution of the patient.

Postpone the TAVi procedure. It is reasonable to postpone consideration of TAVI for 3 months or until improvement of conditions and all elective procedures are resumed, close outpatient monitoring is performed (even by telephone)

3. Critical AS in minimally symptomatic patients: Urgent TAVI as the first line of treatment, and only in case of; scarcity of resources, hospital area with no capacity for physical space, or incomplete medical equipment (clinical cardiologist, intensivist, interventionist, cardiovascular surgeon, or cardiological anesthesiologist, or even paramedical personnel trained in these areas) could consider the possibility of discharge with reprogramming of the procedure with a very close clinical follow-up, even through tele-medicine.

Both urgent TAVI or close follow-up is reasonable according to the availability of resources and in patients with critical and minimally symptomatic AS: They are patients with NYHA III-IV HF and critical or very severe aortic stenosis (area <0.6cm2, <0.4cm2 / m2, Average gradient ≥60 mm Hg, Maximum speed> 5m / s)

4. Severe symptomatic urgent AS: In patients with HF, recurrent syncope or angina despite pharmacological treatment and rest, action should be taken, at the medical discretion, and by the team together; In order to resolve the medical emergency, a balloon aortic valvuloplasty should be considered in the event of availability of resources, an emergency situation, and as a bridge therapy towards surgical valve replacement or TAVI.

At the moment there are no studies that support the use of balloon aortic dilation in severe and symptomatic AS in the context of COVID-19; The ACC / AHA guidelines 2014 and 2017 recommend this strategy when considering bridge therapy towards surgical aortic valve replacement or TAVI (Indication IIb, level of evidence C). (8,9,10.11)

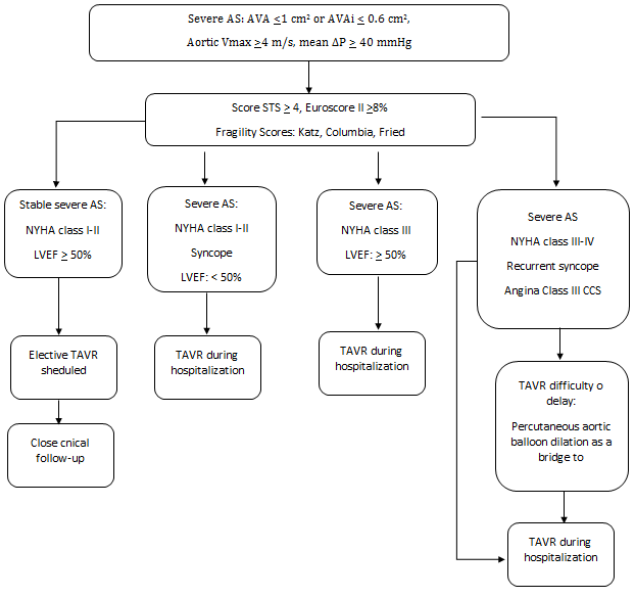


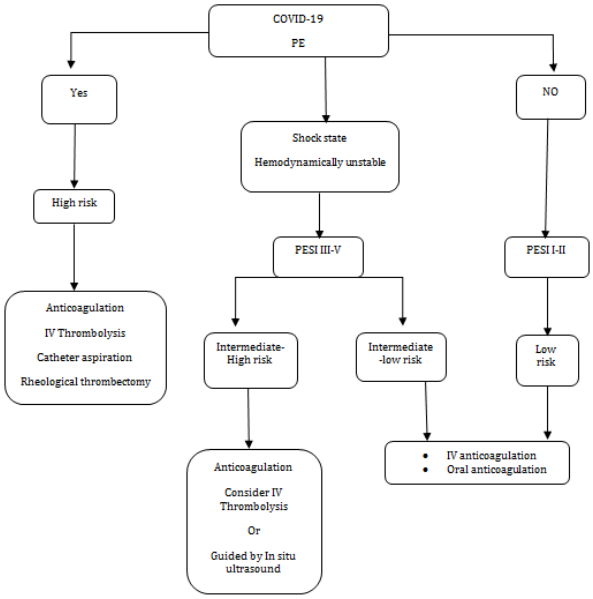
Figure (2): Algorithm Critical severe aortic stenosis at the time of COVID-19.

AS aortic stenosis; AVA aortic valve area; AVAi aortic valve area indexed; Vmax maximum aortic velocity; ΔP pressure gradient; STS society of thoracic surgeons; NYHA New York heart association; CCS Canadian cardiovascular society; LVEF left ventricular ejection fraction; TAVR transcatheter aortic valve replacement

4. ACUTE PULMONARY THROMBOEMBOLISM (PET).

COVID-19 infection has been described as predisposing to arterial and venous thromboembolism due to excessive inflammatory response, hypoxia, immobilization, and diffuse intravascular coagulation. In patients admitted to intensive therapy with COVID-19 pneumonia, an accumulated compound (pulmonary embolism thrombus (PET), DVT (deep vein thrombosis), CVD (cerebral vascular disease), myocardial infarction (MI), or systemic embolism) has been observed. arterial) in 31% of cases (95% CI, 20-41), with DVT in 27% (95% CI, 17-37), and arterial thrombotic events in 3.7% (95% CI, 0-8.2) . PET was the most frequent complication with 25.87% (95% CI, 20-41).(11)

At the moment there are no published recommendations on the management of acute PE in patients infected with COVID-19, so recommendations will be made based on the availability of resources, to current guidelines, taking special attention to the recommended personnel protection measures, thrombolysis will be given priority if required. The following gram flow is suggested, considering the hemodynamic stability and instability the therapeutic behavior to follow (16, 17).



PE pulmonary embolism; PESI pulmonary embolism severity index; IV intravenous.

Figure 3. Management strategy for acute PE according to risk.

Currently, a score or Index of Severity in Pulmonary Embolism (PESI) has been validated, which has been determined; that when the patient is in class I-II of PESI (low risk), he has a mortality risk of 1.2% at 30 days, with a sensitivity of 91%, with a negative predictive value of 99%. (12,13,14)

The PESI Index consists of:

Variable points.	Variable points.
Age by year= 1 points	Heart Rate> 100= 20 points
Cancer 30 points	Respiratory rate > 30= 20 points
Chronic pulmonary diseases= 10 points	temperature <36 °C= 20 points
Male sex= 10 points	Altered mental state= 60 points
Heart Failure= 10 points	O2 saturation <90%= 20 points
Systolic BP <100 mmHg 30 points	

Risk Scale Classification

Class I = 65 points Very low risk

Class II = 66-85 points; Low risk

Class III = 86-105 points; Intermediate

Class IV = 106-125 points; High

Class V => 125 points; Very high

In patients with high-intermediate risk, the reperfusion should be balanced with the risk of embolic and hemorrhagic recurrence, not routine use; The parameters for this decision have not yet been clearly defined, although the suspicion of incipient hemodynamic instability suggests the need for reperfusion with thrombolysis, being Lactate> 2 mmol / l, persistent tachycardia, PAFI (arterial pressure index of oxygen / inspired fraction of oxygen) <200, high-risk electrocardiographic, echocardiographic (pulmonary and / or cardiac) patterns.

Low-intermediate and low-risk patients will be treated with an anticoagulant, the use of DOAC (direct oral anticoagulant) being at the doctor's discretion.

Considering the need for reperfusion through thrombolysis, it is recommended to be systemic, by reducing mortality in PE with hemodynamic instability (Indication level I), preferably short infusion of rTPA (recombinant plasminogen tissue activator) than longer infusions of streptokinase or urokinase . In those cases with failed thrombolysis (without hemodynamic improvement) or contraindicated in hospital, invasive hemodynamic treatment (IIA) will be considered according to the availability of resources (15,16) or even surgical thrombectomy.

	RtPA	Streptokinase	Urokinase
Dosis	Bolus of 100 mg over 2 h 0.6 mg/kg over 15 minutes (maximum dose 50 mg)	250,000 IU over 30 minutes Followed by 100,000 IU/h over 12-24 h Accelerated regimen: 1.5 million IU over 2 h	4,400 IU/Kg over 10 min Followed 4,400 IU/Kg over 12-24 h Accelerated regimen: 3 million IU over 2 h
Absolute contraindications	Active bleeding Major trauma, surgery or traumatic brain injury in the last 3 weeks Bleeding diathesis Central nervous system neoplasm Ischemic stroke in previous 6 months History of hemorrhagic stroke or stroke of unknown origin	The same	The same
Relative contraindications	Traumatic resuscitation Refractory hypertension (BP >180 mmHg. Oral anticoagulation Transient ischemic attack in previous 6 moths Pregnancy or first postpartum week Infective endocarditis Active peptic ulcer Advanced liver disease	The same	The same

Table 1. Thrombolytic regimens, doses and contraindications in acute PE.

* The accelerated rtPA regimen is used in extreme hemodynamic instability, such as cardiorespiratory arrest. CVD = cerebral vascular disease, RtPA = tissue activator of recombinant plasminogen, TA = blood pressure. (19,20,21)

In patients with PE and cardiogenic shock refractory to management with increased preload, vasopressor and inotropic drugs, depending on availability of resources, consideration may be given to transferring them to an experienced center for treatment with Extracorporeal Membrane Oxygenation (ECMO). Said device must be handled by experts in the handling, indications and contraindications of this tool, in order to obtain the maximum benefit of this ventricular assistance for the state of Shock.

Likewise, according to the availability of resources and medical criteria, percutaneous catheter-directed treatment will be considered in patients with high-risk PE, in whom thrombolysis is contraindicated or failed.

The vena cava filter will continue to be indicated in patients with contraindication for anticoagulation or recurrent PE under adequate anticoagulant management, and with documented deep vein thrombosis events in the lower limbs.

5. CONCLUSIONS

It is very important to emphasize that this viral infection COVID-19, currently a pandemic, has a prognosis that could be determined by different pre-existing co-morbid states, and therefore the viral infection can co-exist with other cardiac pathologies, such as chronic coronary syndrome and aortic valve disease (EAo), which in the time of a health emergency makes it difficult to make decisions for the appropriate interventional approach to these pathologies. In the case of Acute Pulmonary Embolism, it is difficult to determine if this pulmonary pathology already existed and was aggravated by the SAR-COV2 infection, or the pulmonary embolic event is part of the pathological courtship of this disease. in such a way that we make a management proposal according to the resources of all kinds of our hospital unit, that could well be adopted by other centers in our environment. Emphasizing our proposal the following protocolized order; 1) correct and exact diagnosis of the disease to be treated, 2) clear indication of therapeutic action 2) risk stratification with scales, as objective as possible, of risk, hemodynamic stability and fragility, 4) individualize each case, but take a decision agreed with the Cardiac Team of the Hospital Unit, 4) adaptation to hospital reconversion, COVID Hospital, Hybrid or not COVID, taking very into account, avoid the spread of the virus, protecting the patient, family members, medical and paramedical personnel who participated in the procedures, 5) according to the previous points, determine the most favorable therapeutic action, based on the risk / benefit of the pathology in question.

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