Letter to the Editor

Cardiovascular Diseases and Covid-19: The Experience Of Ayder Hospital, Tigray Regional State, Northern Ethiopia

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Introduction

Globally as of May 30, 2020 more than 6,000,000 cases and more than 360,000 deaths due to COVID 19 Pandemic were reported. Ethiopia, Africa's second most populous nation with about 107 million people, confirmed its first case of Covid-19 on March 13th, 2020 and as of May 30, 2020 there were 1172 cases with 11 deaths and numbers are expected to increase. So far, In Tigray region there are 48 cases reported and the regional state has decreed a state of emergency at the end of March 2020, which includes travel restrictions to mitigate the pandemic. During pandemics, resources of health systems will be diverted to the emerging health problem and overwhelm the system leading to poor health care delivery to the preexisting major health problems of a given society. The consequence is that both direct mortality from an pandemic and indirect mortality from other conditions increase dramatically. It has been reported that during the Ebola pandemics in 2014-2015, deaths caused by other infectious diseases attributable to health system failures exceeded deaths from Ebola. Countries will need to balance the demands of responding directly to Covid19, while simultaneously maintaining essential health service delivery of Noncommunicable Diseases (NCDs), and particularly cardiovascular diseases (CVDs), as they are the leading causes of deaths globally(1).

In Ethiopia, Noncommunicable Diseases and Injuries (NCDIs) contribute to 52% of morbidity and mortality and 35% of NCD morbidity and mortality are due to cardiovascular diseases (CVD) as per the report from the Federal Ministry of health in 2018 (2). Patients at high risk for death due to Covid19 are those with CVD, Diabetes Mellitus (DM),

Hypertension and other chronic diseases. Hence during the Covid19 pandemic, even though any segment of the essential health services could be affected, the impact on NCDs and particularly CVDs will obviously affect a large segment of the community. Routine cardiovascular care delivery is significantly affected during this Covid-19 pandemic. One of the major pillars stipulated by the World health organization and the Ethiopian Federal Ministry of Health as guidance to maintain essential health services during the Covid-19 pandemic is prioritizing essential services to ensure early identification of the subgroup of NCD patients with special needs. These are patients for whom interruption of treatment could be fatal or critical and may include patients with mechanical heart valves on anticoagulation, patients on medications for whom sudden withdrawal can be dangerous, patients on dialysis, persons with Type 1 Diabetes Mellitus, among others. Covid-19 infection may also have numerous indirect effects relevant to cardiovascular care and health; the cardiology community will play a key role in the management and treatment of patients affected by this disease in addition to providing continuity of care to non-infected patients with underlying CVD(3).

Ayder Cardiology Unit

Ayder Hospital, under the auspices of Mekelle University -College of Health Sciences, was established in 2008. It is located 780 km from the capital Addis Ababa and delivers service to Tigray regional state, parts of Afar and Northern Amhara regional states with a catchment population of approximately 10 million. It has both non-invasive and invasive cardiology services being the first government hospital in Ethiopia to start Cardiac Catheterization (Cath Lab) service in December 2015. Since 2016, the cardiology unit has done 235 Coronary Angiographies and Percutaneous Coronary Interventions (PCI) as of early March 2020. The unit is also performs Permanent Pacemaker implantations, Percutaneous Mitral and Pulmonary valvotomies as well as PDA (patent ductus arteriosus) closures (4).

Cardiovascular Care & Covid-19

During the Covid-19 pandemic, the number of patients seen in the cardiac clinic of Ayder hospital has decreased by 50-60% due to fear of infection with Covid19, lack of transportation due to the

state of emergency, and the hospital's decision to hold elective surgeries/procedure. These patients face two risks, the first is worse outcomes if they get infected with Covid19, the second is reduced access to care (hospital or medications) due to a result of the pandemic. Many cardiac patients live far away from Ayder (more than 400-500 km for some in the western part of Tigray Regional State) and the prescription medications they need may not be available in the district hospitals. The hospitals outside Ayder are also less equipped to handle cardiac patients. For example, only few hospitals have ECG, Echocardiography machines and INR monitoring capability.

The most common cardiovascular problem in our setting is Rheumatic Heart Disease (RHD) (5). A considerable number of these RHD patients will obviously have concomitant Atrial Fibrillation or stroke and some have received mechanical valve replacement at a cost of up to 300,000 Ethiopian Birr (~$8481.72) for a single valve or by the support of nongovernmental organizations (international or local). These patients desperately need warfarin and INR monitoring, otherwise they will be at risk of thromboembolic or bleeding complications. Both Warfarin, and INR monitoring are absent or inadequate in the majority of government institutions in the catchment area except in Ayder hospital. The same is true for other basic Heart Failure, Hypertension and antidiabetic drugs like Beta Blockers, ACE Inhibitors and Insulin. There are also no cardiologists outside Mekelle.

In terms of Emergency patient visits, as part of the general decline in the number of visits, there have been a reduction in cases of Acute Coronary syndrome (ACS) in March to May 2020 but lately we are seeing a surge of some emergency cases. We are witnessing patients having late presentations of ACS with associated complications. Patients who have discontinued treatment presented with acute complications like stroke and Acute Decompensated Heart Failure.

During the pandemic, we have stopped all elective PCIs, in our Cath Lab. Between March 1st and May 15th, 2020, there were 16 registered cases of ACS admitted to our Intensive Care Unit (ICU). We usually treat STEMI (ST elevation Myocardial Infarction) patients with thrombolysis - Streptokinase. Since

the Covid19 Pandemic, one patient was given Streptokinase, but the majority of patients were not candidates for thrombolysis because of late presentation outside the treatment window period (within 12 hours of symptoms). We created a registry of all acute vascular events since mid-May 2020 and we have seen three ACS (two STEMI and one NSTE-ACS), and ten Strokes in just 14 days. The two STEMI patients were negative for Covid-19. One of the STEMI cases, a 68-year-old male with dyslipidemia, presented after four days of chest pain with Cardiogenic Shock. He had cardiac arrest in the emergency room, with successful CPR done. He developed refractory cardiogenic shock; kidney function progressively declined with acidosis and was on a mechanical ventilator for five days before his death.

All Covid19 cases in Mekelle are being managed in a separate treatment center at Mekelle University. No confirmed Covid19 patients have been admitted to our hospital. Our senior staff are assigned to stay for two weeks in the treatment center as senior consultants. Up to the end of May 2020, there has been no severe case of Covid19 in the treatment center. In the hospital, testing of ICU admissions is limited to those with those who fulfill the national case definition and/or Acute Respiratory Distress Syndrome (ARDS). We do not test those with acute vascular events (i.e. ACS, Pulmonary Embolism and Stroke) routinely. It can take up to 4 days to get laboratory results of Covid19 infection which impairs the timely screening and isolation of cases. There is a shortage of Personal Protection Equipment (PPE) in the hospital, we are doing bedside Echocardiography in the ICU with gloves and a surgical facemask for those in need. We are striving to get appropriate PPE to all staffs, which is a global challenge, and increase testing to all admitted cases.

As an academic institution, the educational activities in our hospital have also been affected. It is imperative to minimize exposure among trainees and nonessential staff not only for their own safety and that of their patients, but also for conservation of PPE and for avoiding the unnecessary increase in the number of asymptomatic carriers (3). The undergraduate medical student program is closed but postgraduate medical education programs have continued. The

residents perform triage to detect and isolate cases of Covid-19 as early as possible; with ongoing challenges of access to PPE. Educational Activities are limited by reduction of patient volume and lack of reliable Internet access for tele-education. To mitigate the effects of Covid-19 on CVD, the hospital has arranged a phone call service to cardiac patients as it did for other chronic illness. Those patients who have a phone number recorded in their Ayder hospital chart are contacted and given advice as needed (whether to continue same treatment, postpone appointments or go to the nearest health institution). If the patient resides in Mekelle, they can be advised to come to Ayder Hospital with the appropriate physical distancing measures. Later on, our hospital used social media and mainstream media (Television) to announce a phone numbers for the cardiac clinic (and other units as well). In our hospital, one of the challenges was the lack of a documented telephone address of our cardiac patients. Only 50% of the patients we used to follow in our clinic had a recorded telephone. Setting up a national database of CVDs could have avoided some of these challenges. The other limitation is that most of our patients are also illiterate and barely know how to use telephone itself, let alone social media platforms for patient information (6). As our hospital provides CVD care to many patients from very far areas and communities with no access to a phone, this segment of the population (particularly those in rural areas with no access to pharmacy and unable to travel) are at most risk. Health extension workers are potential bridges in this regard, and they could also identify potential Covid-19 cases and advise patients with chronic illness to seek care earlier.

Conclusion

Covid19 has affected CVD care in our setting. The number of patients with CVD in the outpatient cardiac clinic has significantly decreased and we are seeing more late presentations of vascular events like ACS and stroke. Elective Cardiovascular procedures have been suspended as there are limited PPEs and testing capacities. Educational Activities have also been negatively affected partly due to lack of reliable internet access. Applicability of telemedicine has been challenging as <50% patients have phone numbers

References

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