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EDITORIAL

The frontline of emergency cardiac care in Africa

While a greater percentage of deaths and disability adjusted life years (DALYs) in Africa are still due to infectious disease, ischemic heart disease and acute coronary syndromes (ACS) are rapidly becoming a noticeable part of the disease burden in Africa.[1,2] It follows that over time, resources should likewise become more available to care for patients suffering from cardiovascular emergencies. A simple internet search revealed the presence of cardiac catheterization laboratory services already functioning in Cameroon, Uganda, Kenya, Tanzania and South Africa. It is likely that this service also exists in other African countries. However, given the shortage of specialists in Africa and the tendency of these physicians to cluster around urban areas, the vast majority of Africans experiencing ACS or other cardiovascular emergencies are unlikely to see a cardiologist at any point following a major cardiac event. As a result much of the acute cardiac care provided in Africa is left to acute care providers.

This month's issue of the *African Journal of Emergency Medicine* provides examples of sophisticated emergency cardiac care provided on the continent. Gede et al. describe a patient with Wellens' syndrome who they were able to successfully stabilize in a moderate resource setting and then transfer to a high resource setting for successful catheterization. Wachira et al., describe care and outcomes of patients presenting to an academic hospital in Nairobi with ST elevation myocardial infarction (STEMI). Osei-Ampofo et al. describe a technique to confirm the placement of pericardial drainage catheters under ultrasound guidance and finally Loughborough describes a technique for performing pericardial drainage using improvised equipment and bedside ultrasound.

As acute care develops on the continent, it will be imperative for policy makers and educators to acknowledge the impact acute care providers have on cardiovascular disease outcomes. While no one in the emergency medicine choir needs any preaching to in order to be convinced of the value of what we do, the contribution of emergency care to improve patient outcomes is clearly not well recognized, even among high level policy makers and research foundations, which traditionally have chosen to focus on prevention rather than cure. High quality research therefore needs to take a central role in determining how and to what magnitude acute care providers can improve cardiovascular mortality in a variety of resource settings. Such research can in turn inform training needs, the necessary skill sets required for acute care providers and allow for informed decisions about how to prioritize the introduction of new resources within a specific resource setting.

Contemporary literature indicates that many of the emergency centre (EC) cardiac interventions employed within high resource settings have a low number needed to treat (NNT, Table 1).[3] While the isolated benefit of one of these interventions (e.g. defibrillation) may not nearly be as advantageous as in a setting where more advanced follow-on care is also available (e.g. percutaneous coronary interventions or thrombolytics), benefit may still exist compared to doing nothing. Carefully considered use of limited health care resources will depend not only on the cost of an intervention within a specific setting, but also on the cost of the burden of disease left untreated in that same setting. Therefore, while initially it might seem counter-intuitive to spend money on more expensive interventions in low resource settings, it may in fact be the most sensible thing to do should the cost of burden of untreated disease be higher. This concept is referred to as Cost per DALY averted.

In addition to considering the intervention itself, research on how it is deployed within various resource and cost settings is vital. For example, as it seems likely that cardiac catheterization facilities will remain limited to large urban areas, such as described in Wachira's study, other interventions, such as thrombolytics, would likely have a much wider application. Since physicians are also a limited resource (emergency physicians are all but non-existent in most of sub-Saharan Africa), it follows that use of thrombolytics may have to involve alternate providers (e.g. nurses, prehospital staff, etc.). They will have to be sufficiently skilled to accurately interpret an ECG, determine symptom onset and ensure there are no contra-indications before thrombolytic administration. Prehospital workers have been shown in high income countries to successfully use thrombolytics, but can that be replicated with non-physician clinicians in Africa?[4]

Cost will have to be looked at carefully and interpreted broadly. Take for instance the costs involved in performing CPR on a patient in cardiac arrest. For one, CPR training

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Table 1 The Number Needed to Treat for various interventions needed in cardiac emergencies.[3]

Intervention	NNT	Type of benefit
Aspirin for STEMI	42	Life saved
Thrombolytics for STEMI	43	Life saved if given within 6 h
	63	Life saved if given between 6–12 h
	200	Life saved if given between 12–24 h
Clopidogrel during/after Stenting	27	Non-fatal heart attack or stroke prevented
Defibrillation for ventricular fibrillation	2.5	Life saved (but intervention almost immediately – benefit was time dependent)
Non-invasive positive pressure ventilation for pulmonary edema	13	Life saved
	8	Averted need for intubation

NNT = Number needed to treat to achieve benefit in one patient; STEMI: ST elevation myocardial infraction.

has costs, which likely are not prohibitive. If no post-resuscitation care is available, CPR may be just enough to allow the patient to survive to hospital admission, incur a large hospital bill, but then die before hospital discharge. In a setting where patients may very well be paying out of pocket for such care, futile or near futile interventions may have a significant cost to the family. Clearly the ethics of all of this become very challenging very quickly. Again the answer of where the resource line should be drawn surely lies in the research.

Eventually, a matrix for each intervention can be created that factors in the NNT, prevalence of disease in a given country, district or setting and the cost of deploying the intervention. This will allow policy makers to make informed decisions about what level of acute cardiac care the country, district or setting can offer. The paradigm of considering standard care as a function of local resources available will be crucial: best practice for STEMI in a rural district hospital in Kenya will not compare to best practice delivered at Aga Khan University Hospital in Nairobi. Therefore, answering these highly pertinent clinical questions within the various African resource tiers will be critical to developing logical, effective and sustainable acute care systems. Using robust research to place appropriate emergency care within the chain of survival for cardiovascular disease will improve the attention and resources directed to improving all emergency care in Africa.

Conflict of interest

None declared.

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