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Cardiac surgery: complex individual and organizational factors and their interactions. Concepts and practices.

“Inflexible mentality remains the biggest stumbling block to change.”

Mikhail Gorbachev

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Invited Editorial: Personal View

Cardiac surgery has been available for many years in several developing countries, thanks to the creativity and hard work of individuals who were able to produce good work in spite of the limited resources. Leadership, patience, perseverance, dedication, and the capacity to adapt to adversity have been the keys to success. Limited resources were a constant problem forcing us to focus on short-term creativity about tomorrow's needs. A great deal of energy in the form of leadership and negotiations was used to convince people to continue to work hard for low pay. Our efficiency was suboptimal. Anyone watching migrating geese would discover that they fly in diagonal lines, or “V” formations, to save energy and allow them to fly longer distances. Most importantly, the leader rotates, and we often do not, attempting to solve the puzzle with a personal effort rather than a collective one, exercising leadership with a flexible multi-challenge approach.

Cardiac surgery is a high technology system in which performance and outcomes depend on complex individual and organizational factors and their interactions. Like in any complex system that involves a large number of individuals human errors are possible and can carry major consequences.

Technology and human capital. The general belief that buildings are important has resulted in new facilities spread around in many towns, schools, universities, hospitals, research centers and convention centers, without realizing that the quality of the crew — less visible — is the real determining factor for progress. Economists call the belief that increasing buildings and machinery is the fundamental determinant of growth “*capital fundamentalism*.” The conventional wisdom that investing in buildings and machinery is the key to long-run development is another panacea that has not met expectations unless it is combined with human capital — attributes gained by a worker through education and experience. Societies can grow rapidly by

relying on a well-trained, educated, hardworking, and conscientious labor force that makes excellent use of modern technologies.

Institutional enabling support. Needless to say, it means enabling the faculty to do the work through the active participation of those on the top in addressing and resolving other limiting factors which can eventually narrow down the number of the binding constraints—mutual benefit of changing for the better in a partnership with synergy. Institutional quality is required to achieve a better care in cardiac surgery.

Organizational factors. Team work in which all components of the cardiovascular services—a cluster of people with similar interests and focused on excellence—contributes, although in different degrees, to the quality of the final outcome with an integrated approach in which communication, organization, and mutual supervision are crucial. Using an orchestra as an example of team work, a conductor is needed — the chief cardiac surgeon in most centers — working out the problems these challenges pose collectively, with the individual orchestra members.

Individuals. Exchanges with highly qualified individuals concerning change often involve negotiations and compromise, since they would not comply with the instructions without adequate rationale. It is not a matter of who is right or who is wrong; the focus must be on what both professionals care about: the patient. Though silence is associated with many virtues, it can exact a high price on individuals, generating feelings of humiliation, paralysis, anger and resentment, and eventually, if unexpressed, seriously damage an organization.

Complexity. Although the accuracy and quality of the surgical procedure are the most important determinant of survival after surgery, neonates and infants, in addition to early diagnosis, capabilities for transportation, and pre-operative resuscitation, require expensive sophisticated

support, expertise, manpower, and advanced technology. Given that this cohort of patients has a limited physiologic reserve, complex cardiac lesions that often require technically demanding procedures, and are prone to complications and/or residual related to cardiopulmonary bypass, they are an example that complexity demands complexity.

Because individual medical leadership and skills are not enough to solve these problems—a puzzle with multiple challenges—neonatal cardiac surgery will linger last in most developing countries. I am mindful of the danger of being unjust to people who make choices in conditions of uncertainty and circumstances over which they often had little control. It will require efforts at multi-levels of the national government—leaders with a passion for reducing suffering, able of changing minds and mental models—and the civil society to face reality, adjust values and priorities addressing social exclusion, and the need to overhaul the health care. Institutionalizing change is not an easy task but it is probably the road to sustainability.

Interaction, negotiation and compromise. Ideally, after operation, patients stay in the intensive care unit where the physician on duty must synthesize information from multiple sources and personnel into a cogent plan of care for the patient. When another physician, such as the cardiovascular surgeon, collaborates with the critical care specialist to manage a patient, the relationship requires mutual respect and co-operation in order for optimal patient care to occur. Every interaction in the ICU involving two physicians is a negotiation as much as it is collaboration. Each party approaches the interaction with a preconceived idea of what they want to transpire and there is an urgent need to find common ground to achieve an agreement. I approach these discussions with a few ground rules in mind. *First*, there are certain basic principles of care I know to be true that should not be compromised. *Second*, both parties will learn something from the interaction. *Third*, there is much in medicine that is either uncertain or can be approached in more than one-way. And *finally*, the best plan for the patient usually results from honest open communication between physicians and the melting of the best of both points of view. If both physicians enter into the negotiation with the understanding that give and take is essential to the process, then a well reasoned plan of care is achieved and the patient benefits greatly. A similar approach is applicable to the communications among surgeons, anesthesiologists and perfusionists.

Thoughts on Change. Resistance of people to change and human nature tendency to apply the “minimal risk” and “least effort” strategies that result in incomplete adaptive work allowing subsistence but no optimal result,

explain the frequency and persistence of maladaptive practices. Maladaptive practices exist everywhere, and they eventually become permanent adaptive challenges that do not subside with the application of technical skills provided by a profession. Solutions often reside not in the executive suite but in the collective intelligence of employees at all levels, who need to use one another resources, and learn their way to those solutions. The answer is leadership, an important component of the leadership/management philosophy that fosters transformation by encouraging creative thinking, challenging the status quo, removing barriers and promoting “bottom up” changes. To think creatively means to think “outside the box.” That kind of thinking needs role models, whom we count on to bring us new visions and possibilities.

Business intelligence. Because of the current demand for excellence and transparency, hospitals should start collecting and analyzing data — a method to evaluate future improvements — about outcomes calling for quality from their practitioners in preparation for a not too distant future. Implementing an independent measurement and a reporting system — business intelligence — focused on patient safety with a view to eventually making the information available to the public, will have an impact on quality and consumer and patient satisfaction. It requires good data and commitment of senior executives to fact-based and analytical decision-making as a way to learn rather than doing it *out of gut feel or intuition*. Information can also help those on the top to reflect critically on their own behavior, identify the ways they often *inadvertently* contribute to the organization’s problems, and then change how they act.

Leadership and culture. Having worked in South America, Europe, and most recently in the United States, differences in culture, resources and technology has had a significant impact in my practice and interactions with colleagues, patients and the public. The link between leadership and culture is complex. It is not easy to appreciate or understand that what people do, mean, and say varies from one culture to the next, and without that understanding, it is impossible to lead in another culture. A leadership style that would be effective in one culture may be dysfunctional in another. We all have seen very bright people making mistakes because they didn’t understand the environment in which they were operating.

Altogether, this essay reflects an array of personal views in an era with a tendency to reward those who can accrue technical knowledge, a skill that is only marginally related to the ability of being sensitive to context. It is not linked at all to skills like empathy—an immeasurable variable of human capital. Sometimes diplomacy is necessary to pass the border of ignorance, culture and geography.