

GUEST EDITORS' PAGE

Transcontinental Cooperation of Cardiologists



Caring for Difficult Valvular Cases Supported by “La-Chaine-de-l’esperoir” and “United-Surgeons-For-Children”

Maurice Enriquez-Sarano, MD,^a Alec Vahanian, MD,^b Didier Fremont, MD,^b Thierry Langanay, MD,^c Sanoussy Dcaffé, MD,^d Jeans Koivogui Kokoulo, MD,^e Julia Grapsa, MD,^f Alain Deloche, MD^b

The world is in turmoil. The climate, social upheaval, injustices, and inflation, we have seen before. But the military invasion of another European country we have not seen in the past 77 years, and the COVID pandemic is a catastrophe that the world has not seen in a century. No wonder, medicine is in turmoil. We are not just worried about the medicoindustrial complex with inflated salaries of the CEOs of gigantic institutions,¹ or about the management of emergency room departments by venture capital funds, but on our physician level we see the impact of the pandemic response on the treatment of patients with many conditions, including cardiac diseases. Delaying treatment is often denying treatment. Although it is obvious in the public eye that delaying treatment of lung or breast cancer can have a considerable negative outcome impact, as cardiologists, how long can we delay the treatment of symptomatic aortic stenosis, for example? In contrast, the management of patients with valve diseases in low-income countries was always difficult,² but it has also deeply suffered from the hindered supply chains and the “shelter-in-place” policies. Thus, the functioning of local hospitals and

the transfer to better equipped and staffed facilities remain profoundly affected.

In terms of valvular heart diseases, the needs have been and remain immense. Rheumatic heart disease remains highly prevalent in low-income countries and affects young patients,³ often children. The most typical cases involve the mitral valve with retracted leaflets, thus yielding wide coaptation defect and severe regurgitation (Figure 1). Children and young adults who are affected do not grow well, cannot contribute to their family’s attempts at feeding all mouths, and ultimately incur heart failure and excess mortality at a young age.² Conversely, it is remarkable to observe their body and mind growth and development once the valve disease has been treated. To treat these patients and support the local physicians and medical teams in this tough environment, La Chaine de L’esperoir (The Chain of Hope) used to send missions of cardiologists, anesthesiologists, and cardiac surgeons to many locations all over the low-income world, with the goal of providing diagnoses and treatment to these patients locally, if possible, and of transferring to better equipped facilities, if necessary, those patients in dire need of valvular therapy. Patients with congenital heart diseases were also the focus of attention of specialized teams. Transfer required a complex interaction of legal (visas), social (hosting family), and medical logistics. Although interventions supported by La Chaine de L’esperoir involve many conditions and are conducted by many specialists, our small team focuses on valve diseases. With the pandemic raging, the logistics have been upended, and the possibility of sending medical teams locally

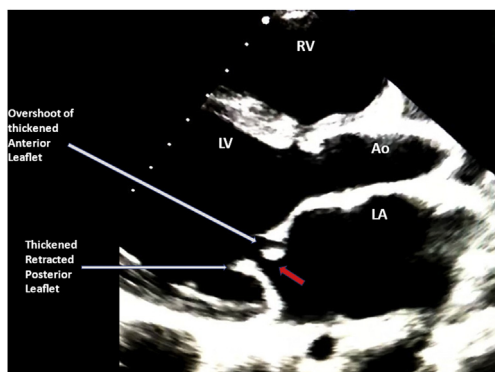
From the ^aMinneapolis Heart Institute, Minneapolis, Minnesota, USA;

^bParis City University, Paris, France; ^cRennes University, Rennes, France;

^dBamako University, Bamako, Mali; ^eIgnace Deen Hospital, Conakry, Guinea; and the ^fGuys and St Thomas NHS Trust, London, United Kingdom.

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FIGURE 1 Parasternal Long-Axis Echocardiographic View in Systole in a 10-Year-Old Boy From Bamako, Mali



The mitral valve demonstrates the thickening and retraction typical of rheumatic mitral regurgitation, with overshoot of the anterior leaflet (behind the posterior leaflet without crossing the annular plane) and a central gap of coaptation (**red arrow**) as the mechanism of the severe mitral regurgitation. Note the enlarged left atrium (LA) and right ventricle (RV) and left ventricle (LV) and the dilated coronary sinus. Ao = aorta.

and of transferring patients to Europe has been severely restricted. The needs remained unabated. How have La Chaîne de L'espoir, United Surgeons for Children, and we as practitioners, donating time and skills to this program, responded? The use of technology has been instrumental in allowing enhanced, not reduced, transcontinental cardiologists' cooperation in diagnosing and treating valve diseases, as well as congenital heart diseases.

WHAT IS TRANSCONTINENTAL CARDIOLOGISTS' COOPERATION

With the goal, in these difficult times, to maintain effectiveness in treating children and young adults with valve diseases who live in low-income countries, it is even more essential than usual to obtain a highly detailed clinical assessment ahead of any medical mission or transfer. This involves social and geographic logistics to ensure the patients' presence and paperwork where required but also detailed clinical information, such as body underdevelopment or homozygotic sickle cell disease, that affect where and when valvular interventions can be performed. However, the main information required

is focused on the valve disease itself and involves imaging as its main tool while knowing that imaging storage, identification, and sharing are not routinely available. Thus, the optimal goal for the team is sharing live echocardiographic imaging of potential patients.

For this purpose, an electronic platform was created to allow bidirectional transfer of live voice and video of all participants, wherever they were located (**Figure 2**), while the live echocardiogram of the potential candidate for valvular therapy is performed and transmitted at a high frame rate and is visible to all involved in this diagnostic endeavor. This shared imaging is performed by the local echocardiographer cardiologist, in constant discussion and cooperation with the remote colleagues, to obtain a detailed and reliable assessment, and it is reviewed by all participants (**Figure 3**). Once the echocardiogram is complete, a whole panel discussion, involving local and remote practitioners, follows to reach a consensus indication and plan of care.

Is this process really indispensable? We do believe so because comprehensive echocardiography is crucial to valvular surgery's success, as opposed to screening echocardiography. During these sessions, the collaborative comprehensive imaging allows refining of the diagnoses provided by screening echocardiograms, with cases where the comprehensive examination ascribed the cause to degenerative or congenital disease, cases that had progressed to multivalve diseases, or cases that had progressed to more profound hemodynamic alterations or ventricular dysfunction, all characteristics affecting management. Some cases were directed at the suggestions of our interventional cardiologists' colleagues to balloon valvuloplasty, and hopefully these options will grow with the increased use of transcatheter therapies. Our comprehensive diagnosis and plan of care are essential because the margin for error or adjustment in case assignment and management has been considerably reduced by the limitations related to the pandemic. Hence, in spite of and maybe because of the pandemic and all the disruptions, the team has evolved to become truly a heart valve team located on multiple continents but working as one, to improve the treatment and outcomes of patients with valvular heart diseases, wherever they may be located within the humanitarian endeavors of La Chaîne de L'espoir and United Surgeons for Children.

FIGURE 2 World Map Showing the Cities From Which the Team Connects to the Electronic Platform for Interactive Echocardiographic and Heart Team Conferences



The cities are indicated by stars.

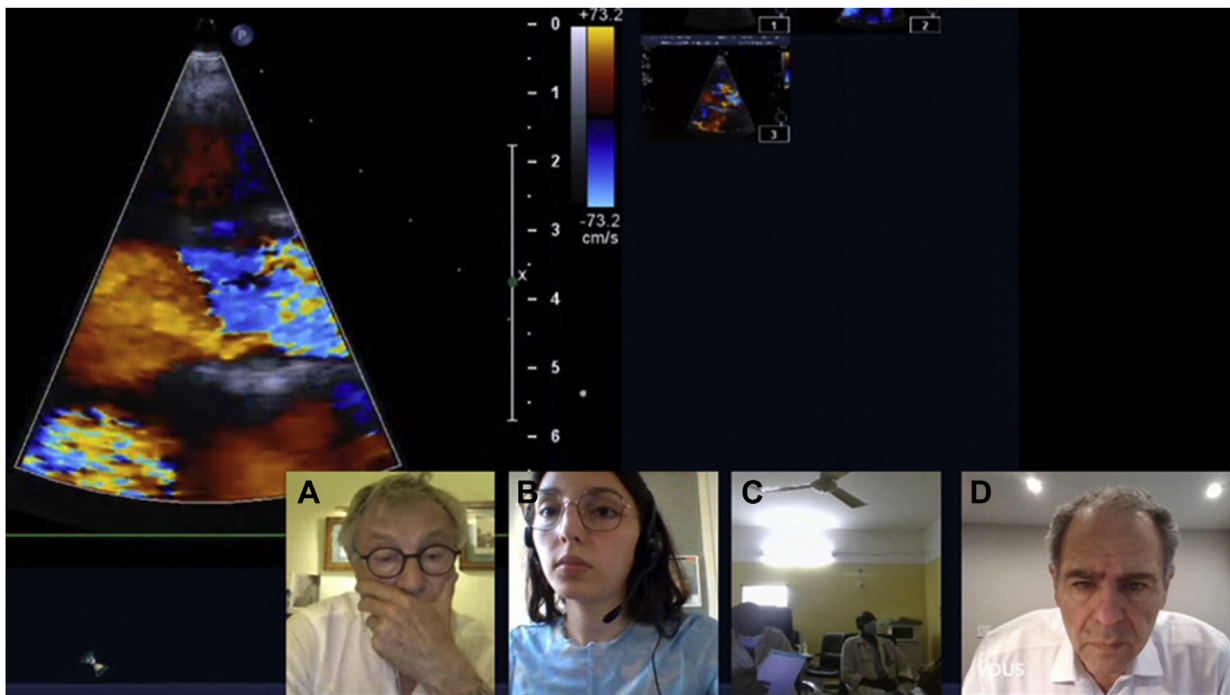
WHAT TO DO NEXT?

EXTENDING COOPERATION. Although we sincerely hope that the pandemic is subsiding, the new way of working as a transcontinental valve team is only beginning, and we aim to amplify it and extend cooperation to many more locations in the world, first those where La Chaine de L'espoir is already serving patients in need and possibly to more locations where our cooperation is needed and invited. Cardiologists, interventionalists, and cardiac surgeons who are willing (and with the bandwidth) to give their time and expertise and willing to learn from our local colleagues and to teach in our new educational endeavors are welcome. For all those who currently feel like small cogs in large medical systems, in this humanitarian endeavor we act as physicians, diagnosing, treating, and hopefully healing. Much remains to be done before

progress and hygiene make rheumatic disease a condition of the past.

LESSONS FOR HOME. Valvular heart diseases have changed in Western countries, where these disorders are mostly degenerative and affect the aging population.⁴ Although we have all means to diagnose and treat valve diseases, in Western countries these diseases remain underdiagnosed and profoundly undertreated. The extraordinary growth of aortic valve replacement for aortic stenosis, in response to the development of transcatheter approaches, demonstrated the profound undertreatment of this condition.⁵ Furthermore, mitral and tricuspid valve diseases remain extremely undertreated in the community.^{6,7} One of the potential causes is that echocardiograms are too often screening echocardiograms and do not provide the precision required for pressing ahead with interventions. We believe that working with live echocardiographic examinations and remote

FIGURE 3 Example of the Electronic Platform During a Collaborative Session



(Left) The live echocardiogram with (right) the corresponding thumbnails. Participants of this session: (inset A) Dr G. Fernandez in Bordeaux, France (cardiac surgeon); (inset B) C. Raid (Logistics, La Chaîne de L'espoir); (inset C) The team in Bamako, Mali; (inset D) Dr M. Enriquez-Sarano in Minneapolis, Minnesota, USA.

heart valve teams has the potential to clarify diagnoses, plan for care with local actors, and decide how and where patients can obtain the best treatment they need and deserve. This live collaboration has a powerful educational outcome for all those involved. We have amazingly effective therapies for our cases involving patients affected by valve diseases. Let us take advantage of the new tools that technology offers to treat these patients wherever they live in the world.

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ADDRESS FOR CORRESPONDENCE: Dr Maurice Enriquez-Sarano, Minneapolis Heart Institute, 28th Street South, Minneapolis, Minnesota 55401, USA. E-mail: sarano.maurice@gmail.com.

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