

Letters to the Editor

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Invitation

We reproduce below the invitation received by Dr. Michel Pompeu Barros de Oliveira Sá and Ulisses Alexandre Croti to attend conferences in China in function of articles published in BJCVS.

Domingo Braile – Editor BJCVS

Dear Dr. Sá Michel P,

On behalf of the Organizing Committee, we are pleased to invite you to attend the EPS Global 1st International Infectious Diseases Conference, which will be held in Shanghai, China, during September 10 and 11, 2010.

We would like you to participate in this meeting as our guest speaker and present your recent work and ideas of “*Postoperative mediastinitis in cardiovascular surgery postoperation. Analysis of 1038 consecutive surgeries*” that were published in Rev Bras Cir Cardiovasc 25.1 [1]. This is one of the high profile and interesting studies we wish to invite to our meeting and we hope it will have benefit to you as well as to our growing scientific community.

Dear Dr. Croti UA,

On behalf of the Organizing Committee, we are pleased to invite you to attend the EPS Global 1st International Pathology Forum, which will be held in Changsha, Hunan, China, during September 17 - 18, 2010.

We would like you to participate in this meeting as a valuable speaker and present your recent work and ideas of Case 8/2007: “Partial anomalous pulmonary venous connection into the right atrium with absence of interatrial communication”, that were published in Rev Bras Cir Cardiovasc 22.4 [2]. This is one of the high profile and interesting studies we wish to invite to our meeting and we hope it will have benefit to you as well as to our growing scientific community.

The conferences will be hosted by EPS Global Medical Development Inc (EPS). Based in Canada, EPS highlights worldwide medical academic exchanges and has gained a high reputation in the world. Firstly in China, we host the EPS Global 1st International Infectious Diseases. The large gathering of world-leading experts and the outstanding scientific program will make this conference the highest-level international event in China.

All researchers and physicians in the field of infectious diseases have a common goal of understanding and fighting the relentless spread of infectious diseases. This conference guarantees attendees the most up-to-date information on epidemiology, clinical presentation, diagnosis, treatment, and prevention of infectious diseases. We believe this conference will be an event that promotes international academic exchanges and cooperation in the field of infectious diseases.

Sincerely,

YaoLu, MD, PhD - Executive Chair of EPS Global 1st International Infectious Diseases Conference - President, EPS Global Medical Montreal/Canadá.

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Transposition of the great arteries with ventricular septal defect and pulmonary stenosis: what is the best surgical option?

Regarding the Letter to the Editor from Luciana Fonseca [1], referring to the work of Gláucio Furlanetto [2] on “Transposition of the great arteries with ventricular septal defect and pulmonary stenosis: what is the best surgical option.”

In order to add another option to the comments of the technical work of Furlanetto, may I stress the experiment results with the Lecompte operation.

Due to known problems with the use of valved tubes in the Rastelli operation [3] in our service (EPM - UNIFESP),

from February 1994 to July 2009, we have operated nine patients to date with TGA + VSD + LVOTO, using the technique of Lecompte [4], with satisfactory results (a 11.1% mortality = death). These initial results were published in the Brazilian Journal of Cardiovascular Surgery [5].

We must point out some advantages and disadvantages of this technique:

Advantages:

1. Procedure performed in lower age patients (2 years);
2. Use of bivalved or trivalved porcine pulmonary prosthesis avoiding the use of valved tubes;
3. Interchangeable technique: Rastelli operation into Lecompte, in patients with obstruction of the valved conduit of adequate size to the patient's weight (the first patient in our series had previous Rastelli and acute obstruction of the tube);
4. Eight patients in our series with follow-up of 2 years to 16 years, all in functional class I-II without reoperation;
5. There was no need for manipulation of the coronary arteries.

Disadvantages:

1. Need for cross section and reconstruction of the ascending aorta in order to perform the Lecompte maneuver;
2. Mobilization and anteriorization of the pulmonary artery;
3. Difficulty of reconstruction of the RVOT when the pulmonary artery is side by side and at the right side of the aorta.

In answer to the author's question: "What is the best surgical option for correction of TGA + VSD + PA?", We must consider the Lecompte operation as a viable and replicable in any Pediatric Cardiac Surgery Service of our midst.

I congratulate the authors for their efforts and results with the Nikaidoh operation.

"Always look for a challenge that is big enough for you"

Walton Lillehei

Miguel Angel Maluf, São Paulo/SP

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4. Lecompte Y, Neveux JY, Leca F, Zannini L, Tu TV, Duboys Y, et al. Reconstruction of the pulmonary outflow tract without prosthetic conduit. J Thorac Cardiovasc Surg. 1982;84(5):727-33.
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Reply

As we can see, the surgical correction of transposition of great arteries (TGA) with ventricular septal defect (VSD) and obstruction of left ventricular outflow tract (LVOTO) has several alternatives and there is a consensus among the various groups that are dedicated to cardiac defects. We can divide the treatment of this heart disease in addressing the outflow tract of the left ventricle and the outflow tract of the right ventricle. The tunneling performed in the Rastelli operation between the left ventricle and the aorta located in the right ventricle is tortuous and is more likely to produce obstruction in the segment in the medium term. The Lecompte operation improves the outflow tract of the left ventricle because with the resection of the infundibular septum the tunneling between the left ventricle and the aorta is more direct, but in both surgeries either the aorta and the pulmonary trunk have no anatomical location. Reconstruction of left ventricular outflow tract in the Rastelli operation is performed with a valved conduit and in the Lecompte operation with a monocuspid autologous pericardium patch. Dr. Miguel Maluf used in the Lecompte operation a fixed bicuspid porcine prosthesis and achieved good results in eight patients in a follow-up of 2-16 years.

The use of the Nikaidoh operation anatomically corrects the outflow tract of the left ventricle, but places no valve at the outflow tract of the right ventricle. In an article by Hu et al. [1], published in the J Thorac Cardiovasc Surg. 2008; 135:331-8, showed better hemodynamic performance of the modified Nikaidoh operation during the immediate postoperative period when compared to the Lecompte and Rastelli surgeries.

The experience acquired in the use of both monocuspid and valved tubes in congenital heart defects and the verification of dysfunction in the medium term of these prostheses, particularly in children younger than 1 year, led us to propose a new technique, called aortic and pulmonary translocation with full preservation of the

pulmonary valve, which differs from the Nikaidoh operation because the reconstruction of the outflow tract of the right ventricle using the pulmonary valve intact and placed in anatomical position. The follow-up of a larger number of patients with this type of surgery is essential for determining whether this procedure is superior to the one that uses monocuspid, bicuspid, or homograft valved conduits in the right ventricle outflow tract.

Gláucio Furlanetto, São Paulo / SP

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Post-cardiac surgery anesthesia: comparison of patient-controlled regimens

Dear Editor,

I read the recent publication on anesthesia after cardiac surgery with a great interest [1]. Mota et al. [1] concluded that "Pain control was effective and similar in both groups" and "Morphine PCA alone seems to be better for postoperative pain management in cardiac surgery, due to its less morphine expense with the same effectiveness." I agree that this is a good experimental study. However, there are some remained questions. The first question is on the exact unit cost for each approach. This should be clarified. In addition, comparative cost effectiveness should also be demonstrated. Second, whether there are any confounding factors due to basic pain perception, pre-operative cardiac pathology status and perioperative status of each patient is a question to be answered.

Viroj Wiwanitkit – Professor of Tropical Medicine, Visiting Professor, Hainan Medical College; Director, Editorial Office – Bangcoc/Thailand

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Radius of the vessel, resistance and coronary flow Part II

Dear Dr. Braile,

In the penultimate edition of our magazine, it was published an interesting article on the physics applied to cardiac surgery: Basic concepts of physics that every cardiovascular surgeon should know. Part I - Mechanics of fluids [1].

As the title suggests, the article is clearly targeted for the training of surgeons. Since that article had a little misconception, when applied to fluid mechanics for a real situation of coronary obstruction, I wrote a letter published in the latest edition of our magazine, pointing out this mistake [2]. In the same issue, there was a response signed by Dr. Marcos Aurelio Barbosa de Oliveira to my letter, which states that the sequential grafts are prone to thrombosis. This concept has clinical and surgical implications as important as questionable. It is my duty to write a new letter of explanation in order to our young surgeons may have a solid education.

First we need to review a few concepts.

The Hagen-Poiseuille equation is a law of physics that describes an incompressible laminar flow of low viscosity through a tube of constant circular cross section.

Downstream of the epicardial coronary branches, the circulatory system unquestionably is no longer straight and, therefore, has no constant circular cross section. "At the capillary level, the red cells fill the lumen and become a sliding piston. Consequently, the flow completely loses its laminar characteristic and acquires the characteristics illustrated in the figure below [3] (Figure 1). Therefore, in the capillary bed, the equation of Hagen-Poiseuille simply expires.



Fig.1 - Flow in the capillary bed. Representation of non-laminar flow in the capillary bed where the red cells become a sliding piston.

But if nonetheless the Hagen-Poiseuille equation (or its variables) is used, a problem remains: there are about 4000 capillaries per mm² of cross-section of the myocardium, which gives a 1:1 ratio of capillary per muscle fiber. Not all capillaries are open at the same time, because the sphincter capillaries exert a regulatory function which represents about 95% of the resistance of the system between the "coronary ostium to the coronary sinus [4]. How do we know which capillaries are open and therefore how many will enter the account so that the "variables in the equation are properly allocated? And even if we knew which are

open, what is the diameter to be considered in each capillary, since the sphincter capillaries that are open will certainly not have total constant relaxation of their muscles?

“It is important to mention that the fine regulation of flow is a vital need for regulation of the heart, because it usually draws 75% -80% of the oxygen that is offered, and the oxygen requirements of the myocardial fibers are attended mainly by adjusting the coronary flow. It is clear, therefore, that despite great changes in myocardial oxygen consumption, oxygen saturation in the coronary sinus remained essentially stable, i.e., 4-5% vol.” [5]. Therefore, it would be unthinkable that the flow of the microcirculation could be determined by the constant diameter of its vessels and, consequently, under the rule of the Hagen-Poiseuille equation and still be able to maintain such a delicate balance.

Regarding anatomy, the characteristic of coronary irrigation is to be terminal, i.e., each arterial branch irrigates a single territory. Evidently there is collateral circulation, which in man under normal conditions is not of great physiological significance, although in the presence of coronary artery disease it may have a considerable functional value [4].

As 95% of the resistance of the system is in the capillary bed, the more muscular territory, the lower the resistance and higher the flow. Therefore, if we use a graft that irrigates two or more coronary branches, it obviously increases the surface area and, consequently, increases the flow by this graft. As only 5% of the resistance of the system is in the upstream segment of the microcirculation, the radius of the graft is of little relevance. This is in accordance with the findings of Nordgaard et al. [6], which showed that the flow of sequential grafts is significantly higher than in isolated grafts and explains why the literature includes studies that show that the sequential grafts are equivalent [7-11] or better [12,13] than isolated grafts.

In summary, the physiologic principles of the coronary circulation exclude the use of the Hagen-Poiseuille equation to determine its flow. There is theoretical and experimental evidence that the flow of sequential grafts is higher than that of isolated grafts. And finally, the literature shows that the sequential grafts are equivalent or superior to the isolated grafts. Therefore, the claim that sequential grafts are more prone to thrombosis finds no support in the literature.

I conclude this letter as I did the last: basic concepts of physics are fundamental, but it takes all care in its application to complex models such as the cardiovascular system.

Thanks,

Roberto Rocha e Silva, São Paulo / SP

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