Introduction and Overview

Symposium for the Future of Cardiac Surgery

1. Why do we need a “Symposium for the Future of Cardiac Surgery?”

The field of cardiac surgery is the speciality in medical therapy that has witnessed unparalleled development and innovation so far.

The very essence of our speciality is pure innovation and creativity, and failure, though nearly omnipresent in the early days, never caused us to stop or slow down the rate at which progress was made. For example, the failures of the first generation of heart-lung-machines did not lead to the abandonment of open-heart surgery. Rather it led to the introduction of 'cross circulation', only to return to the heart-lung-machine a few months later with great success from there on.

Within the extremely short period of only 50 years, cardiac surgery was born and achieved developed to a level never imagined before. In addition to many innovations, techniques were steadily improved, and refinements have led to the routine use of these techniques within a very short period of time. Furthermore, new fields have opened from the original congenital diseases to valve and aortic surgery, coronary artery surgery and transplantation of thoracic organs. During these phases cardiac surgery enjoyed tremendous support from society in general and patients and their relatives. As a consequence, cardiac surgery attracted the best and brightest medical students and residents.

Today we face the fact that true innovations are rather seldom, even though many improvements of existing techniques have led to refinements in standard as well as emerging procedures. Unfortunately only a few reports with a significant number of patients have been published in a randomized, prospective trial to compare the benefits of surgical treatments to other forms of therapy [1,2]. This deceleration in our speciality’s innovative drive has among other reasons-led to the problem that many bright young residents choose other medical fields to pursue training in.

2. Why has cardiac surgery taken this path?

We are the victims of our own success. We were too busy with our everyday surgical activities to take the time necessary to develop innovative strategies. We have also failed to foresee the tremendous impact of new treatment modalities such as PTCA and stenting, in the treatment of coronary artery disease. The drive to open new, so far 'untreatable' diseases for surgical therapies has been insufficient. In summary, we changed—but we have not changed enough.

3. Is this development unique?

No, it is not. On the contrary, it is in fact the rule that successful products, technologies and treatment modalities are replaced by new developments; this process is referred to as the innovation cycle [3].

The life cycle of innovations has seven phases:

Phase 1: Preliminary phase (vision, dream)
Phase 2: Inventive phase (e.g. John Gibbon creates the first heart-lung-machine)
Phase 3: Developmental phase (the invention is patented, improved and developed)
Phase 4: Maturation phase (technique established for routine use, e.g. CABG for treatment of coronary artery disease)
Phase 5: Candidate phase (e.g. cardioplegia emerged concurrent with routine hypothermic fibrillation)
Phase 6: Overtaking phase (the former standard technique is being replaced by the new development)
Phase 7: History phase (the former standard technique becomes 'history').

This innovation cycle takes place in nature (e.g. anaerobic organisms were replaced by aerobic organisms by poisoning (i.e. oxygen) producing blue-green algae), in industry (e.g. 33 rpm recordings → cassettes → digital compact disc (CD)); in medicine (surgery for tuberculosis → medication) and in all other areas of life. The important difference between those eventually are victims of the innovation cycle (e.g. Kodak reacted to the change from film to the digital photography much too late) and those who progress (thoracic surgery conquered other areas (cancer, thoracic cavity), helping cardiac surgery to evolve) is creativity and innovation.

4. What needs to be done?

Obviously the wrong strategy is to prevent others from reaching your level! In order to fully understand...
the magnitude of change and the inevitable rules and development one should read “Who moved my cheese?” written by Spencer Johnson [4].

Innovation must assume a much greater role in our endeavours, as is did in the past. However, innovation comes at a high price, upsets our current way of thinking and might change our lives. Creative people are-by definition-mostly persons with whom it is not easy to live, because they ‘think out of the box’. Innovation is only possible if we accept failure. Innovation without frequent failure is not possible.

"Fail-fail again-fail better!"

"If the worst thing in a society you can do is to fail, that society will not be innovative.”

Of course, adequate financial support is necessary, but money alone cannot buy innovation.

Furthermore, new fields should be opened for therapies currently not available to patients, e.g. surgery to prevent brain damage after CPR (?), surgery in the prevention of atherosclerosis (?), routine surgery for acute myocardial infarction (?), surgery in the application of stem cells (?). Further ‘unthinkable” areas should be opened and explored (Table 1).

“Excellence is the result of caring more than others think is wise, risking more than others think is safe, dreaming more than others think is practical, and expecting more than others think is possible.”

References


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Table 1
What needs to be done?

Increase innovations
Open new fields for diagnosis and treatment
Look into “unthinkable” areas
Improve the documentation and the relative merit of existing therapies in controlled, randomized trials

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