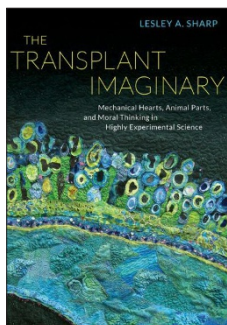


Replacing diseased organs



The Transplant Imaginary: Mechanical Hearts, Animal Parts, and Moral Thinking in Highly Experimental Science

Lesley A. Sharp

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Reviewed by John Bucuvalas

Over the last 50 years, solid organ transplantation has moved from an experimental practice to the standard of care in developed countries. Replacement of diseased organs with allografts (or in the case of the heart, allografts or mechanical devices) is now commonplace. Solid organ transplantation has become an effective treatment for irreversible end-organ disease because there is now effective immunosuppression, improved technical expertise and better options to prevent infection. In particular, the discovery of critical immunosuppressive medications catapulted rarely successful transplantation efforts to ones where outcomes were often excellent.

The knowledge that transplantation offers hope and the chance for an improved life is well known across cultures and continents, and transplantation successes have caused demand to skyrocket. As a result, the demand for organs far exceeds the supply, and potential deceased donor organs are a commodity. Given that it is not ethical for price to dictate access to donor organs, a rationing or allocation system has been used to address the disparity between supply and demand. The allocation policies vary among countries, taking into account the local culture and the resources and expertise of the healthcare delivery system. If we could address the organ shortage challenge with artificial organs or xenografts from animals, then we might not only revolutionize transplantation but solve the moral challenges inherent in the transplantation process. In *Transplant Imaginary*, Lesley A. Sharp challenges the premise that artificial organs and xenografts will solve these issues as she considers the interface between mechanical hearts, xenotransplantation and moral thinking.

In her book, Sharp seeks to consider the way the human body is reconfigured and imagined in the experimental context of xenotransplantation or mechanical circulatory support for the failing heart. She does this by framing the scientific desire to improve the body within the context of the presumed perfection associated with mechanical devices. She does all of this in parallel with her assessment of the promises and challenges of xenotransplantation.

This extraordinarily well referenced and beautifully crafted book describes the history of transplantation and the path to the utilization of xenotransplantation and mechanical devices to support and replace the

heart. The pages are interspersed with narratives from the pioneers in these fields, giving the book a sense of the personal and day-to-day journey faced by the frontline innovators as they were addressing scientific and ethical challenges. The narratives are not the formalized presentations found at scientific meetings but instead the results of interviews with the author. They are therefore quite personal and reflect the challenges at the forefront of innovation.

Through her research and the personal narratives from these scientists, clinicians, engineers and patients, the author explores how political economics of medical research and biotechnology shape the theme of hope and promise when the end result of the new medical procedure may be uncertain. She notes that all players that she met indeed recognized the ethical quandaries of these groundbreaking transplantation efforts. Sharp discusses some potential future challenges as well, including the unpredictability of risk associated with zoonotic infections, the stigma of species hybridization, the potential stress on the human body during and after transplantation procedures, and the danger of device failure.

I found Sharp's comparison of xenografting and bioengineering to be especially revealing. She notes first that it is the success of transplantation and the scarcity of suitable organs that have driven xenografting and bioengineering of artificial organs. Those exploring xenotransplantation were biologists first, and their strategies evolved with the changing culture regarding the use of experimental animals. Sharp discusses in detail the concern about the boundaries between different species and frames these ethical issues as part of the reason for the slow progress in the medical application of these approaches. The slow evolution of the field has promoted enhanced collaboration among xenotransplantation research teams but, at the same time, has hindered funding from investors such as venture capitalists, which may be necessary for the clinical development of these technologies. In contrast to those exploring xenotransplantation, those exploring mechanical devices were engineers first. The ongoing rapid improvement in those technologies has led us to a place where ventricular support devices may deliver outcomes that approach those achieved by transplantation.

Sharp focuses her efforts on five English-speaking countries responsible for much of the innovation associated with transplantation. But she does not address the impact of the advances in those countries on the increasing number of patients from developing countries who have irreversible organ disease or injury and seek cutting-edge treatments not available in their home countries, a process known as medical tourism. I believe that the impact of these efforts on local culture, the diversion of resources and the clear inequities related to access to care in these situations was not sufficiently addressed in the book.

In her book, Sharp has brought out issues that were just below the surface and often left unsaid in the field of organ transplantation. By doing so, she compels us to ask ourselves about the impact of the field on human health. Therefore, I believe this is a critical read for the transplant professional and for anyone who is directly or indirectly involved in the organ shortage problem.

COMPETING FINANCIAL INTERESTS

The author declares no competing financial interests.

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