

Technology In Pain Medicine

Research, Practice, and the Influence of the Market

By James Giordano, PhD



“Technological determinism is...a problem ...in which the forces of technical change have been unleashed, but...the agencies for the control or guidance of technology are still rudimentary...”

—R.L. Heilbroner¹

Recently, Valentinuzzi reported on the widespread use of alternative devices and medicines to treat pain, despite the apparent absence of evidence to validly compel, support and/or sustain the clinical utility (if not safety) of these approaches.² This prompts the question of why these devices and techniques are being used with what appears to be a relative disregard for any substantive validation of safety or clinical value. One possibility is the influence of what Hans Lenk has called “the technological imperative” that is, the perceived need to put into use any and all technologies (and techniques) simply because “we can.”³ This may be the case, at least in part. However, in this essay, I argue that the underlying cause is not simply the urge to use what has been created, but rather the effect(s) of market forces upon the conduct of research that shapes how any new or novel technology is used in medicine (and society, at large). This raises further questions of whether market-dictated forces can be consistent with a regard for patients’ wellbeing and the activities of medicine as an individual and social good.

In citing Hippocratic maxims, Valentinuzzi rightly notes the primacy of patients’ best interest(s) in dictating the ends and goals of medicine. Consistently, both the Hippocratic Corpus and the Oath itself call for the clinician to be prudent regarding using any and all treatments, so as to adhere to, and maximize the ends of the practice.^{4,5} As classically defined, those ends (i.e., the telos of medicine) are the technically right and ethically good care of persons rendered vulnerable by disease, illness, and injury.^{6,7} Clearly such ends establish medicine as a therapeutic and moral endeavor, and the co-actualization of these domains are inextricably interwoven. Moreover, the classical definition does not simply describe the medical condition of the patient, but refers to the existential condition of being a patient as one of vulnerability. It is this vulnerability that drives the patient to both seek the clinician for both her expert knowledge, and trust that her knowledge will be fully and authentically used to lessen and/or prevent (further) suffering or harm(s).⁸

The Role of Research

Research fuels and sustains this knowledge, and should provide the physician with an understanding of which techniques and/or technologies work, which don’t, and why.^{9,10} Research can take time and, while there has been some debate about whether the relative slowness of the research process incurs a negative effect on healthcare (e.g., by delaying the availability of new techniques, technologies, drugs, etc.),¹¹ these concerns are countered by the argument that 1) research is aimed at advancing the “good” of knowledge that can prevent against particular harms (of omission and commission), 2) the research process seeks to evaluate as many variables as possible in this goal, so as to maximize benefit(s) and reduce potential risk(s), and 3) this cannot be rushed or compromised.

Obviously, neither research nor medicine occurs in a social vacuum and so the direction and conduct of both are susceptible to particular socio-cultural and temporal values and biases.¹² Given that science can never be truly “value-free,” it is incumbent upon scientists and physicians (as users and enactors of scientific knowledge) to recognize this potential for value-ladenness, and respond with self-criticism, self-revision, and self-control.

Technological Influence

Determining which technologies to use and which to avoid can be a problem of excessive choice—especially since much of the intellectual landscape of modern medicine has been shaped by technological advances, and this has generally yielded a positive net effect. This tends to reinforce Jurgen Habermas’ claim that the use of technology can be seen as progress.¹³ The Industrial Revolution(s) gave rise to incentives to develop machines to ease and improve the quality of life and, by the end of the 20th century, this had led to considerable social technophilia and technocentrism.¹⁴ To be sure, we must acknowledge 1) the pervasiveness of technology in virtually all facets of modern life, 2) that analysis of health trends in third-world countries that has irrefutably demonstrated that the absence or unavailability of

medical technology incurs significantly negative impact on broad aspects of the public health, and 3) the potential and actual cost-savings afforded through the prudent use of medical technology.¹⁵ Given these facts, it would be counter-intuitive, if not pragmatically and ethically unsound to ignore or refute the benefits of technology in and to medicine. But, to balance that reality, one needs only to consider the philosopher Hans Jonas' reckoning that in modern society, technology has become "...a process" and worldview.¹⁶

Considering Another "Technological Imperative"

The rise of technology concomitantly advanced (and was fortified by) the industrial market-model, as well as the needs and desires for speed and efficiency. While incentives for time-efficiency were initially intended to ease the human condition, the pervasiveness of the market-effect wedded time- and cost-efficiency to end-goals of increasing economic gain(s) with minimal loss (of fiscal, physical, and temporal resources).¹⁷ Therefore, I opine that many of the problems of modern medicine are not due to technology, per se, but to the commodification of medicine, and the use of technology as a leveraging factor in this market ethos.

To be sure, technology has become an important, if not frankly necessary, tool in the contemporary practice of medicine. But given Alasdair MacIntyre's definition of a practice as "...an exchange of the good between individuals ... in relationship,"¹⁸ it becomes clear that the use of technology is not sufficient for the full enactment of medicine as a practice.¹⁹ In fact, the essential, telic "good" of medicine (i.e., a right and morally sound healing) is wholly dependent upon the physician's ability to understand inherent strengths and limitations of any therapeutic(s) in various applications, evaluate the safety, risks, and burdens of use or non-use, and determine the relative benefits that such treatments can provide for specific patients.²⁰ In light of this, I believe that the real "imperative" is not merely to develop and use technology, but to understand how such technology works, and how it could (best) be used to achieve the good ends of medicine. The decisional process that directs this use in the treatment of individual patients is reliant both upon research to determine the practical good of a given technique or technology, and the physician's ability to sift through this available research to direct evidence-based, patient-centered care.

In this latter regard, medicine is both art and skill—what is referred to in classical Greek as tekne.²¹ As a matter of fact, the effective use of research and technology comprises much of the tekne of modern medicine.²² But technology—like any tool—is inert; it must be employed by individuals within a system that establishes paradigms and protocols that define and describe its utility and use(s).

Influence of the Market upon Technological Research and Use

The market-model has come to define much of the use of technology in medicine according to an ethic of profit.²³ Far too often, the market-model mindset, business ethic and ethos dictate what and how technologies are marketed, advanced, and utilized. This can promote an excessive and/or inappropriate use of various technologies at all levels of sophistication, ranging from surface magnets to the most advanced neuroimaging and neurostimulation devices. As a result, the value of research to define the various benefits, burdens, and harms of

technologies and techniques is lessened, and certain technologies are advocated according to their "infomercial" rather than evidence-based impact. This can 1) "sidestep" the discriminative, intellectual integrity of science, 2) advance pseudoscientific findings, 3) subvert the expert knowledge of the physician, 4) compromise physicians' ability to act in patients' best interests, and thereby 5) denigrate the humanitarian and fiduciary aspects of medicine.

As Valentinuzzi remarks, "...many sly people make money out of ignorance of the rest while endangering the health of innocent patients who, one way or the other, must pay..."²⁴ Inarguably, this is in direct opposition to the probity of the medical relationship and contrary to the altruistic and caring virtues that are axiomatic to medicine as a practice and profession.²⁵ Thus, the challenge is to recognize the limits of the market and, in so doing, clarify that while market and business forces may be operative in science and medicine, neither science nor medicine should be conducted as business. Most fundamentally, this is because the profit-oriented ends of business do not comport with the often fragile contingencies of truth in science or the beneficence of medicine.²⁶

"Once considered for, or incorporated into use in medical contexts, technologies and techniques are means toward achieving the humanitarian ends of medicine (not business)..."

And herein lays the crux of the issue. Once considered for, or incorporated into use in medical contexts, technologies and techniques are means toward achieving the humanitarian ends of medicine (not business) and, as such, must be evaluated and employed in accordance with those ends. In this way, they become one of the instrumental "goods" that enable the primary good (i.e. a healing action) of the practice to be achieved, not merely products or commodities of the market. Therefore technologies and techniques must be studied for safety and benefit and utilized in ways that are technically correct and ethically sound and not simply marketed for economic return(s).

Sustaining Obligations for Care

Valentinuzzi recalls the Hippocratic obligation to "...care for patients."²⁷ The etymology of the word care reveals notions of "...deep thought, worry, and strong regard."²⁸ Thus, by definition, care cannot be superficial; such care mandates good scientific studies to reveal the risks and benefits of various technologies that are relevant to clinical contexts and, as I have stated previously and reiterate here, that how such knowledge is acquired and used may be as important as what this knowledge entails.^{29,30} My argument is that research undergirds the telos of medicine by seeking and providing knowledge that 1) enables the physician to evaluate the risks, benefits, and value(s) of treatments and technologies, and 2) empowers patients to be informed participants in their clinical care, thereby lessening their inherent vulnerability.³¹ To achieve this, research must be methodologically rigorous so as to serve its intellectual and ethical good. But if we adhere to the standard that "good" must

entail “right,” then it may become apparent that while controlled, double-blind protocols are effective, they are not the only approaches and may not uniformly best suited to evaluating particular variables and circumstances of real-world use.^{32,33} As new technologies and techniques develop, we may need to examine the methods used to test and evaluate these devices and approaches in different situations and patient populations. This is not to infer that the randomized, controlled, double-blind study should not be used, but rather that we must recognize that our understanding of new technologies and biological organisms and systems prompts a broader, more inclusive palette of research approaches (e.g., use of Bayesian and non-Bayesian methods, attribute-treatment interaction studies, mixed methodologies, etc.).³⁴ Any effort of this type requires participation of “...physicians, biomedical engineers, ...basic medical scientists,”³⁵ and should also conjoin the perspectives of social scientists, philosophers and ethicists, so as to gain a better understanding of how science, medicine, and persons are nested within the domains and values of society and culture. If the template of medical history provides a salient object lesson, then the pattern of hundred-year change in the socio-cultural biases and conduct of medicine would suggest that we are facing a time of potential change catalyzed by the concatenation of technology, economics, politics, and worldview(s).³⁶

Conclusion

As technology progresses, so too do the responsibilities to study, and utilize (or not utilize) these technologies in ways that sustain medicine’s obligation(s) for good and non-harm. These responsibilities should not be subverted by the capricious forces of the market. If we are to 1) validly inform patients about the technologies and techniques that can be employed in pain management, 2) gain consent to use these treatments, and 3) morally sustain the trust of the medical relationship, then it is vital to thoroughly evaluate what approaches work, what approaches do not, and why. The deterministic impetus to “use what we’ve got” because 1) “we’ve got it”, and 2) such use dictates and is prompted by profit(s), leads to the overuse of technology and, in fact, the undertreatment (i.e., failure to render right and appropriate care) of pain. In sum, the

more we know—about the brain-mind, pain, healing, as well as technology and the social forces that affect its development and use—the more there is to discover, and the more rigorous, diverse, and collaborative our approaches to discovery and practice must be. ■

Dedication

This writing is dedicated to the memory of my father: an engineer, idealist, humanitarian, and teacher.

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