

Op-Ed

Cosmetic Neurology: For Physicians the Future is Now

Medications for brain enhancement raise many ethical concerns regarding the roles of personal autonomy and responsibility.

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Basic neuroscience and neuropharmacology are beginning to yield therapies for cognitive disorders. While we can eagerly anticipate treatments for dementing illnesses, stroke, traumatic brain injury, and developmental abnormalities, these very treatments raise uncomfortable questions. If we can improve cognitive systems in disease, can we also do so in health? Should we practice cosmetic neurology?

The possibility of "better brains" has captured the imagination of the press, policy pundits, and ethicists [1-10]. With few exceptions, physicians have not contributed to these discussions, despite their central role in this unfolding drama [11,12].

Cosmetic neurology includes the use of botulinum toxin to brush away wrinkles. However, it also alters how we function and feel, rather than just how we look. Many interventions to improve cognitive and emotional systems are available now, and others are on the horizon. The risks and benefits of newer medications remain to be worked out. However, we can assume that some version of these medications will be relatively efficacious and safe. The accompanying article on neuroethics by Martha Farah reviews the anticipated pharmacopeia of cosmetic neurology and the deep ethical concerns raised for individuals and society (also see [12]). The focus here is on the role of the physician in managing the use of cosmetic neurologic interventions.

Framing the Issue: the Purpose of Medicine

Ethical discussions of cosmetic neurology often frame the issue as one of therapy versus enhancement [6,13]. Therapy treats disease and enhancement improves normal abilities. Most people consider therapy desirable. By contrast, many pause at enhancement. Francis Fukayama, for example, opines, "the original purpose of medicine is to heal the sick, not turn healthy people into gods" [14]. He suggests that public policy should restrict research for enhancement.

For 2 reasons, the distinction between therapy and enhancement is less useful than one might hope. First, notions of disease often lack clear boundaries. For example, if individuals of short stature can be "treated" with growth hormone [15], does it matter whether they are short because of a growth hormone deficiency or because of other reasons [13]? Second, promoting research for therapy and restricting it for enhancement ignores the simple fact that research in one often applies to the other.

The therapy versus enhancement distinction also obscures what for physicians may be the critical question: What is the purpose of medicine? The strength of allopathic medicine has been its scrutiny of disease mechanisms. Understanding the biology of malfunction provides insight into how to fix that malfunction. Despite its undoubted successes, this approach has limits. Most notably, the quality of patients' lives does not always correspond well to biomarkers and symptoms of disease. The symptoms of Parkinson's disease that are most responsive to dopamine agonists are not those that bother patients most [16]. Measures of disease activity may not be the best indicator of the impact of multiple sclerosis on patients [17]. Recognizing the limits of clinical and pathological indices, assessing patients' quality of life is now a routine practice in therapeutic trials. Such assessments seem eminently reasonable. After all,

the point of treating a disease is to improve patients' quality of life. However, if a purpose of medicine is to improve quality of life for people who happen to be sick, then why not apply medical knowledge to improve the quality of life of those who happen to be healthy?

Inevitability

Cosmetic neurology raises several serious ethical concerns. These interventions challenge fundamental notions of character and individuality; it is *likely* that they will be used coercively, and cosmetic neurology will not lessen the burden of distributive justice in a country in which the quality of health care is polarized by economic class. It is improbable, however, that cosmetic neurology will be restrained significantly by journalistic consternation, religious admonition, and government regulation. More likely, such restraints will be overwhelmed by free markets and military innovations.

The market. Pharmaceutical companies stand to make substantial profits and will probably support social pressures that encourage wide use of cosmetic neurology. According to Carl Elliott, in 2001 GlaxoSmithKline spent \$91 million dollars in direct advertising to consumers for its medication Paxil [8], more than Nike spends on its top shoes. Advertisements for better brains would undoubtedly prey on an insecure public. Ginkgo Biloba, despite underwhelming effects on cognition [18], is a billion dollar industry. Pharmaceutical companies are not oblivious to the marketing possibilities of new "interventions" that could apply to the entire population [19,20]. Sadly, the academy is *unlikely* to restrain Industry. Scientific leaders who discover new therapeutic possibilities are quick to stake biotech claims [20]. Joint ventures between universities and pharmaceutical companies are increasingly common.

The military. Imagine a soldier who is stronger, faster, more enduring, learns more quickly, needs less sleep, and is not hampered by disturbing combat memories. The military's deep interests in cognitive enhancements date back to "go-pills" (amphetamines) for World War II soldiers [20], and continue to the present [20,21]. For example, military investigators found that modafinil [a wakefulness-promoting agent] has its greatest effects in helicopter simulation performances at the combined nadir of sleep deprivation and circadian troughs [22]. Relevant findings from military research are likely to trickle down to civilians. Over-fed Hummer vehicles maneuver through the cobbled streets of Philadelphia. Perhaps Hummer brains are around the corner.

The Role of Physicians

Americans believe that the pursuit of happiness is an inalienable right. This pursuit assumes we know what constitutes happiness [23]. Fame and fortune have been standard proxies for happiness in American culture. Better brains may very well join the list, either as a means to fame and fortune or as a direct source of happiness [24].

Scientific, economic, marketing, and regulatory forces are likely to shape the role physicians will play. The details are difficult to predict, but what is certain is that physicians will engage in cosmetic neurology. This practice will be complicated by the fact that physicians will not be able to rely on the conventions of traditional practice. Neurologists may have special understanding of the potential risks and benefits of quality of life interventions that work through the nervous system, but they have no special insight into the underpinnings of happiness.

One plausible scenario is that physicians will become quality-of-life consultants. Physicians might offer a menu of options, with the likely outcomes and the incumbent risks stated in generalities. The role would be to provide information while abrogating final responsibility for decisions to patients. Abrogation of such responsibility is promoted by current practice norms. Financial incentives in medicine are now driven by paper trails and diagnostic studies, rather than by personal engagement with patients. A comfortable stance would be to let people decide for themselves. After all, isn't autonomy what patients want?

It turns out that the degree of autonomy patients want is not so clear, especially when they are sick (as reviewed in [25]). Furthermore, the bewildering array of choices available to American consumers in almost every domain of life is a source of considerable anxiety [26]. A practice of medicine that encourages patients to be consumers is in danger of compounding these anxieties. I am not advocating that physicians become disengaged purveyors of quality-of-life elixirs. I am suggesting that this role is a distinct possibility given current trajectories of medical practice. In a litigious

society, many physicians would gladly shed the irksome traditional mantle of beneficence.

Where do you stand?

Since 1997, the FDA has permitted direct marketing to consumers. Physicians can anticipate facing questions from "patients" and advocacy groups in which distilling principle from prejudice is not easy. To make these issues concrete, I invite readers to consider the following questions.

1. Would you take a medication with minimal side-effects half an hour before Italian lessons if it allowed you to learn the language more quickly?
2. Would you give your children a medication with minimal side-effects half an hour before piano lessons if it allowed them to learn better?
3. Would you pay more for flights whose pilots were taking a medication that made them react better in emergencies?
4. Would you want residents to take medications after call nights that would make them less likely to make mistakes in caring for patients because of sleep-deprivation?
5. Would you take a medicine that selectively dampened disturbing memories?

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