Innovative Ophthalmic Products and Their Road to FDA Approval

The FDA was created based on a need for safe and effective therapies in the United States, and the need for its intricate review and regulatory process remains. | by Steven J. Dell, MD

The FDA review and approval process is often criticized and questioned, but strict regulatory oversight of drugs and devices exists in part because people in free societies like ours will try almost anything to obtain a cure or make a profit. As with most regulatory agencies, the FDA can trace its origins to situations where fraud, abuse, or dangerous practices led to injuries in an unsuspecting public.

LEARNING FROM THE PAST

For example, in 1902, several children contracted tetanus and died after receiving diphtheria antitoxin from a horse with tetanus.[1] Public outrage over this incident and others eventually led to the passage of the Food and Drug Act in 1906, which ultimately led to the formation of the FDA. In its early years, there was considerable controversy over the proper role of the FDA and scope of its authority.

In 1927, a wealthy industrialist named Eben Byers injured his arm and began taking a product called Radithor. This patent medicine was created by William Bailey, a college dropout who claimed to be a medical doctor,[2] and Radithor seemed to work well until Beyer's jaw fell off and he died. In 1937, more than 100 people died after taking sulfanilamide, which was incorrectly prepared with a toxic solvent.[3] In the aftermath of these tragedies and others, the powers of the FDA were expanded.

Controversy over the proper role of the FDA continues to this day. One significant area of current controversy involves dietary supplements, which fall under a different set of regulatory rules than drugs. The FDA's role in monitoring nutritional supplements is much more limited, and abuses have occurred. Some nutritional supplements have been found to be illegally spiked with prescription medication. Others contain toxic or even carcinogenic substances. According to a study published in the *New England Journal of Medicine*, an estimated 23,000 emergency room visits occur each year as a result of complications from dietary supplements.[4] The vast majority of dietary supplements are safe and marketed by responsible companies, but as in the distant past, unscrupulous companies continue to exist.

The FDA seems receptive to the notion that drugs and devices can be safely evaluated and approved in a more timely fashion than in the past without compromising patient safety. In fact, there have been substantial changes in the speed with which FDA approvals occur. A recent study published in *New England Journal of Medicine* found that FDA drug approvals are outpacing European Union approvals.[5] A number of recent political changes seem to signal that even more regulatory streamlining may be in store for the FDA.

Still, there are many technologies in ophthalmology that have been widely used outside the US for years that many surgeons wish were available here. Sometimes the lack of availability is simply a matter of money. As the costs associated with FDA approval have increased, many good technologies simply do not provide a sufficient economic return to justify the expense of obtaining US approval.

We sometimes see in our patients both the positive and negative effects of medical devices implanted outside the United States. One example of negative effects involves the use of cosmetic iris implants intended to change a patient's eye color. Several patients with these cosmetic implants have landed in our clinics with a host of complications including glaucoma, corneal edema, uveitis, and cataract.[6] None of these cosmetic iris implants are FDA approved. While some of our patients might lament that this technology is unavailable to them in the United States, most ophthalmologists would agree with the position statement of the American Academy of Ophthalmology strongly discouraging their use.[7]

CONCLUSION

No one wants a return to the unregulated chaos of poisonous, contaminated, or radioactive medications. Safety is and should remain the No. 1 priority of all stakeholders in the approval process. While we can take some comfort from the fact that US approvals are outpacing those of the EU, one hopes that this is indeed due to streamlining of the FDA approval process and not the result of bogging down of the EU approval process. Evidence points to the former, and I hope we continue to see progress in this direction. ■

1. FDA. fda.gov/AboutFDA/WhatWeDo/History/ProductRegulation/100YearsofBiologicsRegulation/ucm070022.htm. Updated April 9, 2009. Accessed June 13, 2017.
2. New York Times. http://query.nytimes.com/gst/abstract.html?res=9505E7D8163EE633A25751C0A9629C946394D6CF&legacy=true. Accessed June 13, 2017.
3. FDA. fda.gov/AboutFDA/WhatWeDo/History/ProductRegulation/SulfanilamideDisaster/default.htm. Updated October 20, 2010. Accessed June 13, 2017.
4. Geller AI, Shehab N, Weidle NJ,et al. Emergency department visits for adverse events related to dietary supplements. *N Engl J Med.* 2015;15;373(16):1531-1540.
5. Downing NS, Zhang AD, Ross JS. Regulatory review of new therapeutic agents—FDA versus EMA, 2011-2015. *N Engl J Med.* 2017; 376:1386-1387.
6. Hoguet A, Ritterband D, Koplin R, et al. Serious ocular complications of cosmetic iris implants in 14 eyes. *J Cataract Refract Surg.* 2012;38(3):387-393.
7. AAO. Cosmetic iris implants carry risk of permanent eye damage, vision loss . aao.org/eye-health/tips-prevention/iris-implants-risk-eye-damage. Updated October 29, 2014. Accessed June 13, 2017.

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