Autoinjector Misconceptions – A Review of the Evidence

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Since the introduction of the "patient-friendly" autoinjector formulation, millions of doses of EpiPen® and EpiPen® Jr. have been sold in the United States and throughout the rest of the world. Today there are a number of other autoinjectors available to deliver the life-saving medication epinephrine (AdrenaClick®, Epinephrine Injection® USP [Mylan], Epinephrine Injection® USP [Teva], and Auvi Q®), but the progenitor product EpiPen® has really become synonymous with epinephrine autoinjectors in the same that we use Kleenex® when referring to tissue paper. The question today is whether we have become so acclimatized to this product that we no longer question its safety and clinical effectiveness – two things which are paramount in-patient care.

Myth	Review of Evidence
Safety	
The FDA approved design of autoinjectors provides easy and safe delivery epinephrine for anaphylaxis events	• *Device failure from spontaneous activation caused by using sideways force to remove the blue safety release*[1,3,5,6,7,9,10,20,22,23] • *Device failure from inadvertent or spontaneous activation due to a raised blue safety release*[1,9,10,20,22,23] • *Difficulty removing the device from the carrier tube*[1,9,10,20,22,23,27,] • *User errors*[1,2,3,4,5,6,7,9,10,11,12,13,14,15,20,22,23,26,28,29,30,31,33]
Healthcare professionals are proficient in the use of autoinjectors	• *One third of the user errors reported to the FDA Adverse Events are from healthcare professionals*[3,4,6,7,9,10,14,15,16,17,18,19,20,21,22,23,24,25,27,29,30,31,32,33]
Autoinjector's needles always deliver lifesaving epinephrine and never are associated with failures	• *There have been additional autoinjector failures due to the short needle length and therefore the inability to deposit this lifesaving drug to the fine capillary bed below the vastus lateralis (thigh muscle) when administered*[21,22,28,29,32]
Efficacy	
Only one twin pack of autoinjectors needs to be stocked according to regulatory guidelines	• *CDC through IAC guidelines calls for three doses of epinephrine which would require 2 adult twin packs for adults and/or 2 junior twin packs of pediatrics*[20,29,34]
Autoinjectors always administers the right amount of epinephrine for the right patient	• *Other challenges have arisen from giving the wrong dose (strength) to the wrong patient (pediatric versus adult), since the autoinjector delivers the entire contents of the device when it is activated*[18,20,22,23,25,27,29]
Costs	
Only one twin pack of autoinjectors needs to be stocked	• *Autoinjectors are designed to deliver 0.3mg of 1:1000 epinephrine to adult patients while the Junior is designed to deliver half that amount, 0.15mg of 1:1000 epinephrine, to pediatric patients. The challenge with the autoinjectors is that they are single use only and you cannot give the adult formulation to pediatric patients and vice versa, so practitioners who treat both adults and children must have three autoinjector of each strength to comply with IAC guidelines*[34] • *The half-life of epinephrine is only two minutes so if patients need subsequent injections, or the EMTs are more than 10-15 minutes away, then some patients require a third injection*[34]
Autoinjectors are the most the most cost-efficient method of complying with the epinephrine requirement	• *Epinephrine convenience kits probably provide value beyond the safety and efficacy concerns listed above. They have the appropriate length needle, a vial of epinephrine to accommodate multiple doses of adult or pediatric injections, a longer shelf life, and all at a price point far below the average wholesale price of all autoinjectors currently available in the U.S.*[20,21,22,23,25,26,27, 34]

Summarizing Autoinjector Misconceptions

There is a plethora of evidence from the medical literature demonstrating that epinephrine autoinjectors are not as safe nor as clinically efficacious as we continue to trust and believe. The clinical pitfalls of the autoinjectors should convince practitioners that kits offer the additional advantage of a medical time out; not to slow the delivery of care, but to insure we maximize both the safety and efficacy of this life-saving drug. The use of an epinephrine kit may also be more desirable since it provides more than one dose of epinephrine in managing both pediatric and adult patients. Furthermore, the kit contains needles of appropriate length to overcome some of the failures seen with autoinjectors. Lastly, the shelf life of these kits is typically much longer than the autoinjectors so practitioners do not have to waste and re-purchase stock as often due to outdated products. All of these clinical benefits are significant, especially when considering the convenience cost and price of the autoinjector dosage form.

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