

A Year of Experience Using Spiralth, A Lithium Hydroxide Carbon Dioxide Absorbent

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Background/Introduction: Little information describing implementation and use of SpiraLith² products is available. This abstract summarizes about 15 months use in a single hospital. Recirculating “circle” anesthetic circuits require removal of respired carbon dioxide to prevent rebreathing. Granular, disposable products have been long used. One of the identified problems with many products is production of potentially toxic degradation products, limiting practice of low-flow anesthesia. SpiraLith² is an alternative product employing lithium hydroxide suspended in a polymer matrix that does not produce toxic byproducts. One publication has compared characteristics of several products.¹ Greenhouse gas emissions are another concern addressed by low-flow.³

Methods: Because lithium hydroxide is relatively expensive and recyclable, a log of every unit has been kept to account for returns. There is no color indicator to indicate exhaustion of CO₂ absorbing capacity, so clinicians are to request replacement of the cartridge units when inspired CO₂ concentration reaches 5-7 torr, or about 1%. The log records 1251 units since initiation of use on 3 Sep 2014. Large units fit tandem cylindrical modules (Aestiva), or smaller units fit in custom-made “stein” modules (Aespire, Aisys) for GE anesthesia machines.

Results: The log was created for tracking of recycling. It suffers from missing data and unstandardized reporting of the inspired CO₂ at the time of replacement. Figure 1 illustrates that the smaller stein cartridges have had a median service of about 1 week, while the larger tandem cartridges have a broader distribution, with median service about twice as long. There is a strong dependency measured inspired CO₂ on fresh gas flow, approximately doubling with halving of flow. Also, more cartridges are consumed with high CO₂ loads (e.g. laparoscopy) or low-flow. The second figure illustrates a modest downward trend in total volatile anesthetic agent consumption since introduction of SpiraLith absorbers.

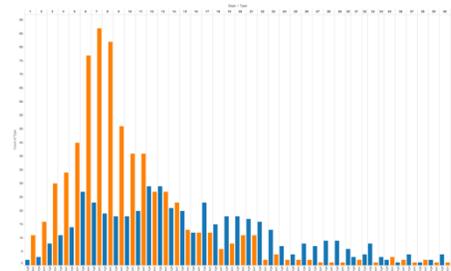
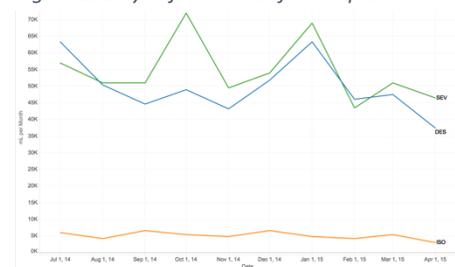


Figure 1: Days of Service before Replacement



Conclusion: Lithium hydroxide absorbing cartridges are a viable alternative to granular CO₂ absorbents. Preliminary results may demonstrate a trend to use of lower total gas flows with corresponding decrease in volatile anesthetic agent consumption and waste volatile agent discharge to the atmosphere.

References:

- 1.Hendrickx et al., J Clin Monit Comput. 2015
- 2.www.spiralith.com, accessed 28 Dec 2015
- 3.Sherman et al., A&A 114:1086, 2012