

City Hospitals Sunderland NHS Foundation Trust – Target Controlled Volatile Anaesthesia (TCA)

In February 2012, Dräger Zeus® Infinity Empowered (IE) target controlled capable anaesthetic machines were introduced into all operating theatres within City Hospitals Sunderland NHS Foundation Trust.



City Hospitals Sunderland NHS Foundation Trust had been striving to reduce the volatile usage within the anaesthesia department since 2008. The Trust undertook an audit and investigated using semi-closed circle breathing systems on the Trust's Dräger Primus machines. Analysis showed that using the uptake and consumption information provided by their Primus machines in conjunction with a "low flow" protocol produced a sustainable reduction of hourly volatile costs in the operating theatres.

In 2012, the Trust needed to make a decision on whether to extend the lease on the Primus machines beyond the initial seven years or replace the equipment. The Trust was considering the benefits of Dräger Zeus® IE and began a trial of the equipment. In February 2012, Zeus® IE machines were installed in all 23 operating theatres.

Dr James Tulloch, Consultant Anaesthetist at Sunderland Royal Hospital, said:

"We viewed target control as a natural progression of what we were trying to achieve in terms of optimising efficiency of agent delivery. Our overall aim was to try and push everyone within the department into using our new anaesthetic machines to their full capabilities as soon as possible. We decided on a complete change-over to the new technology rather than a phased replacement programme. All 23 machines were introduced over a two week period with support and prior training from Dräger."

TCA ADOPTION

Of course, these benefits could be outweighed by the prospect of unfamiliarity with new equipment – potentially leading to clinical incidents and the risk of failure of adoption of the TCA capability in practice. Dr Tulloch explains:

"Having made the decision to purchase the Zeus® IE, we had to ensure that we as a department fully utilised the Target Control mode and didn't just use the machines in the traditional way.

"The reason was that we believed the acceptance of the new technology would improve if it is done in one step rather than piecemeal over a period of time."

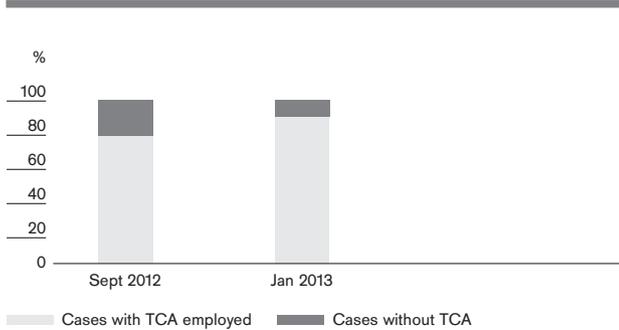
"It didn't take long for our staff to familiarise themselves with the new technology – and within two months the whole department were using the machines as we had hoped."

An audit was carried out to show the extent of uptake of target control by staff and whether this had impacted on the usage of anaesthetic agents in comparison to the previous year.

Results

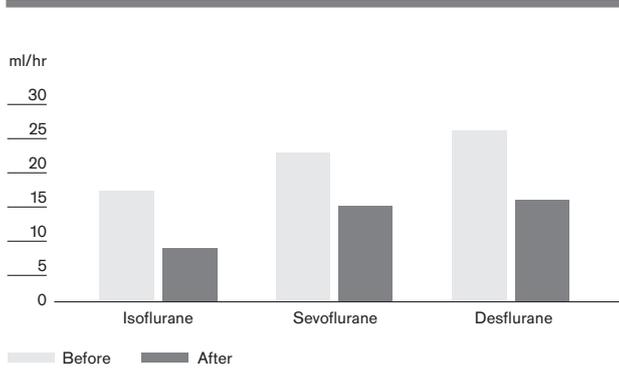
The audit showed the extent of adoption of 'auto-control' of anaesthesia at six months and one year following the introduction of the Zeus® IE machines.

PERCENTAGE OF CASES WITH TCA V CASES WITHOUT TCA

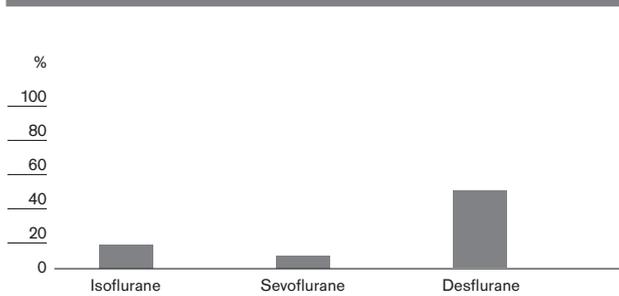


An analysis of pharmacy data relating to anaesthetic drug usage was conducted to compare the 12 month periods pre and post introduction of the new machines. Although the number of cases had risen slightly on the year to year comparison the usage of all three drugs had reduced.

MEAN IN-THEATRE VOLATILE CONSUMPTION (ML/HR) BEFORE AND AFTER TCA INTRODUCTION (N=153)



PERCENTAGE REDUCTION IN VOLATILE CONSUMPTION AGAINST PREVIOUS YEAR



The highest saving of agents was with Desflurane (49.7%) since Isoflurane and Sevoflurane were used in the induction room without TCA functionality.

From Low Flow to Closed Circuit:

The drive for efficiency

Target controlled volatile anaesthesia has been successfully and safely introduced in a wholesale fashion across City Hospitals Sunderland NHS Foundation Trust.

There were no significant reported untoward incidents or patient-related incidents in the first year of use, showing that the movement to the Zeus® IE machines with TCA technology had not led to an increase in risk to patients.

This quality improvement in efficient and safe delivery of anaesthesia has been achieved through avoidance of piecemeal introduction of TCA machines coupled with an education and audit programme.

High TCA adoption rates have further reduced annual volatile consumption at the Trust. In fact, TCA machine adoption has been associated with a 20% reduction in overall volatile use against best-achieved figures utilising the Primus and low flow protocols – thus delivering measurable economic and environmental benefits to the Trust.



Dräger Zeus® Infinity Empowered in use.

Dräger Zeus® Infinity Empowered

Target Controlled Volatile Anaesthesia (TCA) via the Zeus® IE is a more efficient method of delivering volatile anaesthesia – as opposed to delivery of volatile anaesthesia via a traditional anaesthetic device.

The user directly selects the desired end tidal volatile concentration which limits the number of tasks required during a task intensive period. Algorithms instruct the machine to deliver the target in a reliable and cost-efficient manner, thereby eliminating human-based unwanted variation. The Zeus IE device delivers patient gases and the anaesthetic agents in parallel – therefore removing the need to raise fresh gas flows to wash in anaesthetic agents.



Dräger Zeus® Infinity Empowered.



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AS OF AUGUST 2015

Dräger Medical GmbH changes
to Drägerwerk AG & Co. KGaA.