

Introducing the Diamedica Sevoflurane Inhaler for Labour Analgesia – a Practical Comparison with 50% Nitrous Oxide / 50% Oxygen Mix

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Background and Objectives:

The standard inhaled analgesia for labour pain is 50% nitrous oxide/50% oxygen mix (N₂O/O₂) but high cost and logistical difficulties restrict generalised use. Sevoflurane is an effective, safe alternative analgesic [1] and is preferred to N₂O/O₂ in labour [2]. The Diamedica Sevoflurane Inhaler (DSI) is a draw-over vaporizer for self-administration of 0.69-0.9% sevoflurane [3]. We compare the practical features and cost of DSI analgesia with N₂O/O₂.

Materials & Methods:

The physical attributes, purchase price and running costs of the DSI were compared with an N₂O/O₂ size ED cylinder, using UK list prices from major manufacturers (DSI – Diamedica UK; Sevoflurane – AbbVie; N₂O/O₂ – BOC; demand valve – Therapy Equipment Ltd). Calculations were based on a minute volume of 7.5 Litres over a period of 5 minutes.

Results:

| Device | DSI (includes case) | N ₂ O/O ₂ ED cylinder |
|--|----------------------|---|
| Capacity, ml | 150 | 7000 |
| Dimensions, cm | 35 x 30 x 25 | 52 x 10 |
| Gross weight, kg | 4.5 | 4 |
| Minimum oxygen delivery, % | 21 | 50 |
| Maximum oxygen delivery, % | 99 | 50 |
| Run time from full, hours | >10 | 7.7 |
| Refill technique | bedside | specialist |
| Device cost GBP (USD) | 1650 (2293) purchase | 350 (487) purchase + 178 (247) rental per annum |
| Agent price per 5 minutes at minute volume 7.5L GBP(USD) | 0.18 (0.25) | 0.08 (0.11) |



Conclusion:

Although sevoflurane has been shown to be a more effective analgesic than N₂O/O₂ for women in labour, it has not been widely used due to the absence of a suitable delivery system. The DSI is compact, light and refilled at the point of use from a small bottle, enabling easy transportation and use in isolated or hostile environments. A full DSI provides analgesia for over 2 hours longer than a full ED cylinder of similar size. The DSI is an inexpensive alternative, which can be used for inhalational analgesia in labour and a wide range of other situations when N₂O/O₂ is unavailable, contraindicated or when additional oxygenation is required.

References: [1] Yeo ST, Holdcroft A, Yentis SM, Stewart A, Bassett P. Analgesia with sevoflurane during labour: I. Determination of the optimum concentration. *British Journal of Anaesthesia* 2007; 98(1):105-9. [2] Yeo ST, Holdcroft A, Yentis SM, Stewart A, Bassett P. Analgesia with sevoflurane during labour: II. Sevoflurane compared with Entonox for labour analgesia. *British Journal of Anaesthesia* 2007; 98(1):110-15. [3] Miller LA, Makins H, Eltringham R, Neighbour R. Sevoflurane for analgesia-testing a modified vaporizer for delivery. *Anaesth Intensive Care*. 2015 Jul;43(4):518-27.

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