

Comparison of the T-piece resuscitator with other neonatal manual ventilation devices:

Colin Patrick Hawkes Anthony Ryan Eugene Michael Dempsey

Department of Neonatology, Cork University Maternity Hospital, Ireland

Department of Paediatrics and Child Health, University College Cork, Ireland

Aim: To review the literature surrounding various aspects of T-piece resuscitator use, with particular emphasis on the evidence comparing the device

to other manual ventilation devices in neonatal resuscitation.

Data sources: The Medline, EMBASE, Cochrane databases were searched in April 2011.

Ongoing trials were identified using www.clinicaltrials.gov and www.controlled-trials.com

Additional studies from reference lists of eligible articles were considered.

All studies including T-piece resuscitator use were eligible for inclusion.

Results: Thirty studies were included. There were two randomised controlled trials in newborn infants comparing the devices, one of which addressed short and intermediate term morbidity and mortality outcomes and found no difference between the T-piece resuscitator and self inflating bag. From manikin studies, advantages to the T-piece resuscitator include the delivery of inflating pressures closer to pre-determined target pressures with least variation, the ability to provide prolonged inflation breaths and more consistent tidal volumes.

Disadvantages include a technically more difficult setup, more time required to adjust pressures during resuscitation, a larger mask leak and less ability to detect changes in compliance. **Conclusions:**

There is a need for appropriately designed randomised controlled trials in neonates to high-light the efficacy of one device over another. Until these are performed, healthcare providers should be appropriately trained in the use of the device available in their departments, and be aware of its own limitations.

© 2012 Elsevier Ireland Ltd. All rights reserved.

Introduction

Between 5 and 10% of newborn infants require resuscitation at birth.^{1,2}

Effective positive pressure ventilation can be vital to successful neonatal resuscitation.³

Current guidelines in neonatal resuscitation recommend three devices; the self inflating bag (SIB), flow-inflating bag (FIB) and T-piece resuscitator (TPR).^{4–6}

The prevalence of TPR use varies throughout the world, and many surveys describing their use have been published. In 2004, they were used in 48%

of centers in Australia and New Zealand,⁷

and 30% of centers in an international survey involving 23 countries.⁸

More recent surveys identified that they are used in 31% of centers in Ireland,⁹ 45% of resuscitation areas in Spain,¹⁰ 80% of Austrian

Abbreviations: PIP, peak inspiratory pressure; PEEP, positive end expiratory pressure; TPR, T-piece resuscitator; NP, Neopuff; SIB, self inflating bag; FIB, flow inflating bag; NRP,

O was significantly better using a T piece than either self-inflating bag (proportion within target range 0.05 (95% CI 0–0.11), 0.17 (95% CI 0.12–0.23), 0.89 (95% CI 0.83–0.94) for 240-ml and 500-ml self-inflating bags and “Tom Thumb” T

piece, respectively. Excessive pressure delivery with both sizes of self-inflating bag was frequent.

Conclusions:

These data do not support use of 240-ml or 500-ml self-inflating bags for resuscitation of newborn term infants. A variable

pressure T piece blow-off system may be the easiest device to use for newborn resuscitation and the most reliable at delivering desired

pressures for set times

[Children and Young People's Nursing at a Glance](#)

Alan Glasper, Jane Coad, Jim Richardson - 2014 - Medical

Effective **resuscitation** of the newborn baby requires good organization and ... T-piece circuit; **Tom Thumb** or T-piece device • Self-inflating bag (500 mL) with ...

[Neonatal Emergencies - Page 78 - Google Books Result](#)

[Sabaratnam Arulkumaran](#) [Lesley Regan](#) [Aris Papageorgiou](#) 2011 - Medical

Introduction **Resuscitation** of the newborn infant differs from that of any other age ... or preferably a pressure-limited '**Tom Thumb**' or other ventilation device.

[Neonatal support for stand alone Midwifery Led Units](#)

2011 - Medical

Introduction **Resuscitation** of the newborn infant differs from that of any other age ... or preferably a pressure-limited '**Tom Thumb**' or other ventilation device.

Providing newborn resuscitation at the mother's bedside: assessing the safety, usability and acceptability of a mobile trolley

Margaret R Thomas¹, Charles W Yoxall^{1*}, Andrew D Weeks² and Lelia Duley³

- Corresponding author: Charles W Yoxall Bill.Yoxall@lwh.nhs.uk
Neonatal Unit, Liverpool Women's Hospital, Crown Street, Liverpool L8 7SS, UK
Department of Women's and Children's Health, University of Liverpool, Liverpool, UK
Nottingham Clinical Trials Unit, University of Nottingham, Nottingham, UK

For all author emails, please [log on](#).

BMC Pediatrics 2014, **14**:135 doi:10.1186/1471-2431-14-135

The electronic version of this article is the complete one and can be found online at: <http://www.biomedcentral.com/1471-2431/14/135>

Received: 16 December 2013

Accepted: 23 May 2014

Published: 29 May 2014

© 2014 Thomas et al.; licensee BioMed Central Ltd.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/2.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated.

The LifeStart® trolley manufactured by Inditherm (October 2012).

The trolley was introduced into Liverpool Women's Hospital, a busy tertiary referral unit with approximately 8,000 births per year. The trolley had additional equipment attached, namely: suction equipment, a gas flow metre (Oxylite Ltd. Manchester, UK), a gas blender (Inspiration Health Care Ltd. Leicestershire, UK) and a t-piece resuscitator (Tom Thumb infant resuscitator, Viamed Ltd. Yorkshire, UK). Our practise is to place all babies born before 30 weeks gestation into a plastic bag immediately

after birth to assist in maintaining body temperature. For all babies born before 28 weeks a self heating gel mattress is used in addition to this. Although the trolley has a warming system incorporated into it, this had not been evaluated as the only method of providing thermal support during initial stabilisation of extremely preterm babies. We, therefore, continued to use the plastic bags and self heating gel mattresses in addition to the warming system provided by the trolley for babies born before 30 weeks and 28 weeks respectively. The trolley was used for any delivery at which an Advanced Neonatal Nurse Practitioner (ANNP) or paediatrician was required to attend, according to the hospital policy:

[The Midwife's Labour and Birth Handbook - Google Books Result](#)

[Vicky Chapman](#) Cathy Charles 2013 - Medical

device;a T-piece device,e.g. **Tom Thumb**,may be more effective (Wyllieetal., ... and a common reason for failed initial **resuscitation** (see Tables 18.1 and 18.2).

Mercury Medical

Guidelines for resuscitation

WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care Worksheet author(s)

Date Submitted for review: Clinical question. In neonates(P) receiving positive pressure during resuscitation, is positive pressure ventilation by T-piece resuscitator (I) superior to bag ventilation (C) for improving outcome - specify (O)? Is this question addressing an intervention/therapy, prognosis or diagnosis? Intervention State if this is a proposed new topic or revision of existing worksheet: Subsidiary question from a previous worksheet Conflict of interest specific to this question Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? No Search strategy (including electronic databases searched). The subject area was included in a previous worksheet for C2005. I included relevant articles from the earlier worksheet. To look for new data on the subject I searched all new material from Jan 2004 to September 2009. I searched the Cochrane database using the keywords resuscitation, newborn; mask ventilation, newborn; and T-piece, newborn and identified no reviews or registered trials. I searched Pub Med using the following keywords and in all cases limited to articles with abstracts: Resuscitation and newborn 1534 hits. Positive pressure ventilation and newborn 480 hits T-piece 48 hits Mask ventilation 84 hits I searched Embase for the same time period with the following terms, limited to articles with abstracts Resuscitation and newborn 793 hits Positive pressure ventilation and newborn 112 hits T-piece 157 hits Mask ventilation 220 hits. • State inclusion and exclusion criteria All titles and abstracts were reviewed. Articles were selected as relevant if they described the use of both devices in some way that would permit comparison for initial resuscitation after birth in humans or in relevant animal models or bench models. Reference lists of selected articles were reviewed for further possible articles. Review articles and articles describing surveys of practice were not included. • Number of articles/sources meeting criteria for further review: 7, all were LOE

Innovation in immediate neonatal care: development of the Bedside Assessment, Stabilisation and Initial Cardiorespiratory Support (BASICS) trolley A D Weeks,¹ P Watt,² C W Yoxall,³ A Gallagher,⁴ A Burleigh,⁵ S Bewley,⁶ A M Heuchan,⁷ L Duley⁸

Providing newborn resuscitation at the mother's bedside: assessing the safety, usability and acceptability of a mobile trolley

[Margaret R Thomas](#),¹ [Charles W Yoxall](#),¹ [Andrew D Weeks](#),² and [Lelia Duley](#)³

The trolley was introduced into Liverpool Women's Hospital, a busy tertiary referral unit with approximately 8,000 births per year. The trolley had additional equipment attached, namely: suction equipment, a gas flow metre (Oxylitre Ltd. Manchester, UK), a gas blender (Inspiration Health Care Ltd. Leicestershire, UK) and a T-piece resuscitator (Tom Thumb infant resuscitator, Viamed Ltd. Yorkshire, UK).

www.rcjournal.com/contents/12.09/12.09.1638.pdf

by JW Salyer - 2009 - [Cited by 6](#) - [Related articles](#)

about the performance of self-inflating-bag **resuscitators** in neonatal scenarios. the **Tom Thumb** brand, which is marketed in Europe and has a factory-preset ...

[Newborn baby died over hospital blunder](#)

A baby died 20 minutes after birth when her lungs burst after being mistakenly flooded with **oxygen**, an inquest heard yesterday.

*Kathryn Leigh needed help when she was delivered in a frail and floppy condition in an **emergency caesarean** section. But, the 8lb 1oz infant was connected to an oxygen tube meant for adult patients instead of a 'Tom Thumb' **resuscitator** for children.*

*Oxygen was pumped into her lungs at 60lb per square inch, about twice the pressure used for car tyres and 137 times that of the children's resuscitator. Neonatal consultant Bob Welch admitted a 'gross error' had taken place at the **Royal Shrewsbury Hospital**, but no one has admitted connecting the tube to the wrong mechanism. The inquest jury returned a verdict of misadventure, reducing Kathryn's parents Philip, 35, and Sonia, 30, to tears – because they believe the hospital has escaped with little punishment. The couple, from **Telford, Shropshire**, had hoped a ruling of unlawful killing could be considered, but this was not allowed. Dr Anirban Maitra, who was responsible for Kathryn's resuscitation, said that when the baby had been handed to him, she was very frail and 'floppy' while her chest was not moving. But he refused to answer several questions under a rule allowing him not to respond to any which could incriminate himself.*

Comparison of the T-piece resuscitator with other neonatal manual ventilation devices: A qualitative review

Colin Patrick Hawkes Anthony Ryan Eugene Michael Dempsey

The Management of Labour

By Arulkumaran

Scancrit.com LMA IN NEONATE RESUS

Posted on [April 16, 2012](#) by [Thomas D](#)

Dear Thomas,

Thank you that is very helpful. I was referring to use of a Neopuff or other PEEP apparatus such as the

Tom Thumb. These will give much more reliable and consistent pressures than is possible with a BVM.

Comparison of the T-piece resuscitator with other neonatal manual ventilation devices: A qualitative review [Colin Patrick Hawkes](#), [C. Anthony Ryan](#) and [Eugene Michael Dempsey](#)