----- Original Message -----
From: Pantelaki, Irini
To: prom@nikaia-hosp.gr
Cc: Katsanos, Konstantinos ; Papadopoulou, Eugenia (Contractor)
Sent: Thursday, May 29, 2014 11:27 AM
Subject: ΔΗΜΟΣΙΑ ΔΙΑΒΟΥΛΕΥΣΗ ΤΕΧΝΙΚΩΝ ΠΡΟΔΙΑΓΡΑΦΩΝ ΘΕΡΜΟΚΟΙΤΙΔΩΝ_Draeger Hellas

Αξιότιμοι κύριοι,

Στα πλαίσια της δημόσιας διαβούλευσης Τεχνικών Προδιαγραφών για την προμήθεια θερμοκοιτίδων, σας αποστείλαμε κείμενο με τις παρατηρήσεις και τις προτάσεις μας την 29η Μάιου 2014 στο ηλεκτρονικό ταχυδρομείο του γραφείου Προμηθειών του Νοσοκομείου σας, με σκοπό την τελική διαμόρφωση των εν λόγω προδιαγραφών.

Η απόπειρα παρεμβάσεων και προτάσεων της εταιρίας μας Draeger Hellas έχει σαν σκοπό την ανάπτυξη πλήρους και υγιούς ανταγωνισμού της αγοράς προς όφελος του Νοσοκομείου σας.

Η εταιρία μας Draeger Hellas A.E είναι θυγατρική εταιρία της Dräger Γερμανίας η οποία κατέχει ηγετική θέση παγκοσμίως στην κατασκευή και διανομή αναισθησιολογικών μονάδων, αναπνευστήρων, θερμοκοιτίδων, μόνιτορ παρακολούθησης, συστημάτων διαχείρισης και παροχής ιατρικών αερίων καθώς και εξοπλισμό χειρουργείου (χειρουργικοί προβολείς , pendands κ.λ.π.).

Στην διάθεσή σας για οποιαδήποτε άλλη πληροφορία ή διευκρίνιση,

Irini Pantelaki

Sales Engineer
Product Specialist

Draeger Hellas S.A
150, El. Venizelou Str
Nea Ionia, Athens
142 31, Greece
Tel: +30 210 28 21 809
Fax: +30 210 2821214
Mob: + 30 6974 002 521
irini.pantelaki@draeger.com
www.draeger.com

Dräger. Technology for Life®

Dräger

ΠΡΟΣ: Γενικό Περιφερειακό Νοσοκομείο
Νίκαιας Πειραιά ΑΓΙΟΣ ΠΑΝΤΕΛΕΗΜΩΝ
Δ. Μαντούβαλου 3, ΤΚ 184 54

Υπ' όψιν: Γρ. Προμηθειών
Τηλ.: 213-2077407/8
Fax: 210-4910602
E-mail :prom@nikaia-hosp.gr

Αθήνα, 29 Μαΐου 2014

Αξιότιμοι κύριοι,

Στα πλαίσια της δημόσιας διαβούλευσης Τεχνικών Προδιαγραφών για την προμήθεια θερμοκοιτίδων, σας αποστείλαμε κείμενο με τις παρατηρήσεις και τις προτάσεις μας την 29η Μάιου 2014 στο ηλεκτρονικό ταχυδρομείο του γραφείου Προμηθειών του Νοσοκομείου σας, με σκοπό την τελική διαμόρφωση των εν λόγω προδιαγραφών.

Η απόπειρα παρεμβάσεων και προτάσεων της εταιρίας μας Draeger Hellas έχει σαν σκοπό την ανάπτυξη πλήρους και υγιούς ανταγωνισμού της αγοράς προς όφελος του Νοσοκομείου σας.

Η εταιρία μας Draeger Hellas A.E είναι θυγατρική εταιρία της Dräger Γερμανίας η οποία κατέχει ηγετική θέση παγκοσμίως στην κατασκευή και διανομή αναισθησιολογικών μονάδων, αναπνευστήρων, θερμοκοιτίδων, μόνιτορ παρακολούθησης, συστημάτων διαχείρισης και παροχής ιατρικών αερίων καθώς και εξοπλισμό χειρουργείου (χειρουργικοί προβολείς , pendands κ.λ.π.).

Στην διάθεσή σας για οποιαδήποτε άλλη πληροφορία ή διευκρίνιση,

Ειρήνη Παντελάκη
Sales Engineer
Product Specialist
(κιν. 6974002521)

Κωνσταντίνος Κατσάνος
Διευθυντής τμήματος

Draeger Hellas A.E
Ελ. Βενιζέλου 150,
ΤΚ 142 31, Νέα Ιωνία
Ελλάδα
Τηλ.: 210 2821809
Fax: 210 2821214

www.draeger.com

Draeger Hellas S.A
150, El. Venizelou Str.
142 31 , Nea Ionia
Greece

www.draeger.com

ΣΗΜΑΝΤΙΚΗ ΠΑΡΑΤΗΡΗΣΗ/ΔΙΕΥΚΡΙΝΗΣΗ:

- Με πράσινο χρώμα σημειώνονται οι προτεινόμενες προσθήκες επί των προδιαγραφών
- Με κόκκινο χρώμα σημειώνονται τα τεχνικά ή άλλα χαρακτηριστικά που προτείνεται να διαγραφούν τελείως ή να τροποποιηθούν

1) Η θερμοκοιτίδα να είναι καινούργια, αμεταχείριστη σύγχρονης τεχνολογίας, ~~διπλού τοιχώματος~~ με Microprocessor ψηφιακή οθόνη και εγκεκριμένη από όλους τους διεθνείς οργανισμούς ασφαλείας. Η προσφορά να συνοδεύεται από πιστοποιητικό CE.

3) Η καμπίνα νεογνού να είναι από διαφανές υλικό και διπλού τοιχώματος.

Η προδιαγραφή 1 προτείνεται να διαμορφωθεί ως εξής:
«Η θερμοκοιτίδα να είναι καινούργια, αμεταχείριστη σύγχρονης τεχνολογίας, με Microprocessor ψηφιακή οθόνη και εγκεκριμένη από όλους τους διεθνείς οργανισμούς ασφαλείας. Η προσφορά να συνοδεύεται από πιστοποιητικό CE»

ΑΙΤΙΟΛΟΓΗΣΗ:
Στις ανωτέρω δύο προδιαγραφές αναφέρετε δύο φορές το ίδιο ζητούμενο τεχνικό χαρακτηριστικό «η θερμοκοιτίδα να είναι διπλού τοιχώματος». Προτείνουμε την απαλοιφή του ζητούμενου τεχνικού χαρακτηριστικού στην προδιαγραφή 1.

4) Να διαθέτει δυο πόρτες πρόσβασης και 4 πορτάκια χειρός καθώς και εισόδους αεραγωγών και ακροδεκτών. Η εμπρόσθια πόρτα να είναι μεγάλη ώστε το στρώμα του νεογνού να σύρεται έξω από τη θερμοκοιτίδα.

Η προδιαγραφή 4 προτείνεται να διαμορφωθεί ως εξής:
Να διαθέτει δυο πόρτες πρόσβασης και 4 πορτάκια χειρός καθώς και εισόδους αεραγωγών και ακροδεκτών. Και οι δύο πόρτες να είναι μεγάλες ώστε το στρώμα του νεογνού να σύρεται έξω από τη θερμοκοιτίδα. Κατά το άνοιγμα των πορτών αυτών να μη μεταβάλλεται σημαντικά η θερμοκρασία της θερμοκοιτίδας.

ΑΙΤΙΟΛΟΓΗΣΗ:
Οι ανωτέρω προτεινόμενες προσθήκες εξασφαλίζουν την ισότιμη συμμετοχή όλων των κατασκευαστών θερμοκοιτίδων. Επιπλέον παρέχουν σημαντικά πλεονεκτήματα που στόχο έχουν την διατήρηση του επιπέδου νοσηλείας των νεογνών, σε συνδυασμό με την διευκόλυνση της παρακολούθησης τους από τους χρήστες (περιποίηση, εξετάσεις κλπ).

5) Να διαθέτει μία μεγάλη οθόνη που να παρέχει απεικόνιση των εξής παραμέτρων: θερμοκρασία αέρος, ρυθμισμένη θερμοκρασία δέρματος και αέρος, υγρασία, ~~ισχύς θερμαντήρα~~, συγκέντρωση οξυγόνου, συνθήκες συναγερμού και μνήμη.

Η προδιαγραφή 5 προτείνεται να διαμορφωθεί ως εξής:
Να διαθέτει μία μεγάλη οθόνη που να παρέχει απεικόνιση των εξής παραμέτρων: θερμοκρασίας δέρματος, θερμοκρασία αέρος, ρυθμισμένη θερμοκρασία δέρματος και αέρος, υγρασία, συγκέντρωση οξυγόνου, συνθήκες συναγερμού και μνήμη

Draeger Hellas A.E

Ελ. Βενιζέλου 150
ΤΚ 142 31, Νέα Ιωνία
Ελλάδα
Τηλ.: +30 210 2821809
Fax: +30 210 2821214

www.draeger.com

Draeger Hellas S.A

150, El. Venizelou Str.
142 31, Nea Ionia
Greece
Tel.: +30 210 2821809
Fax.: +30 210 2821214

www.draeger.com

ΑΙΤΙΟΛΟΓΗΣΗ:
Η προσθήκη της απεικόνισης της θερμοκρασίας δέρματος είναι ένα τεχνικό χαρακτηριστικό διαθέσιμο από τις περισσότερες αν όχι όλες τις θερμοκοιτίδες της Ελ. Αγοράς.
Επιπρόσθετα σε ένα σύστημα ρύθμισης, μέτρησης και απεικόνισης της θερμοκρασίας, όπως περιγράφετε παραπάνω, αναμενόμενο είναι εκτός της ρυθμιζόμενης θερμοκρασίας δέρματος να μετράται και να απεικονίζετε και η μετρούμενη θερμοκρασία δέρματος.

Σε αντίθεση η απεικόνιση της ισχύς του θερμαντήρα είναι περιοριστική χωρίς να προσδίδει οπωσδήποτε κλινικό ή θεραπευτικό όφελος για τον ασθενή, ενώ είναι χαρακτηριστικό που πληρείται από συγκεκριμένο κατασκευαστή και συνεπώς περιορίζει την συμμετοχή αξιόπιστων κατασκευαστών, με ηγετική θέση στην παγκόσμια αγορά.
Η απαίτηση ρύθμισης, μέτρησης και απεικόνισης των θερμοκρασιών δέρματος και αέρος καλύπτει απόλυτα την δυνατότητα απεικόνισης της ισχύς του θερμαντήρα.

6) Να υπάρχει η δυνατότητα ψηφιακής ρύθμισης της θερμοκρασίας κατά τη λειτουργία δέρματος 34-39ο C και κατά τη λειτουργία αέρος 20-39ο C με βήμα ρύθμισης 0,1ο C.

Η προδιαγραφή 6 προτείνεται να διαμορφωθεί ως εξής:
Να υπάρχει η δυνατότητα ψηφιακής ρύθμισης της θερμοκρασίας κατά τη λειτουργία δέρματος 34-38ο C και κατά τη λειτουργία αέρος 20-39ο C με βήμα ρύθμισης 0,1ο C.

ΑΙΤΙΟΛΟΓΗΣΗ:
Το εύρος της ψηφιακής ρύθμισης της θερμοκρασίας κατά τη λειτουργία δέρματος είναι περιοριστικό χωρίς να προσδίδει οπωσδήποτε κλινικά ή θεραπευτικό όφελος για τον ασθενή.
Το εύρος αυτό δεν προκύπτει από τα Ευρωπαϊκά πρότυπα [1], αλλά ούτε και από πληθώρα κλινικών μελετών [2, 3], όπου ανατρέχοντας θα διαπιστώσετε, ότι η μέγιστη ψηφιακή ρύθμιση της θερμοκρασίας κατά τη λειτουργία δέρματος είναι περίπου 36° C. Τέλος περιορίζει την συμμετοχή αξιόπιστων κατασκευαστών, με ηγετική θέση στην παγκόσμια αγορά.

10) Η θερμοκοιτίδα θα πρέπει να έχει ειδική επιλογή σίγασης των συναγερμών καθώς ~~και δυνατότητα ρύθμισης της έντασης τους.~~

Η προδιαγραφή 10 προτείνεται να διαμορφωθεί ως εξής:
Η θερμοκοιτίδα θα πρέπει να έχει ειδική επιλογή σίγασης των συναγερμών, θα εκτιμηθεί η δυνατότητα ρύθμισης της έντασης τους .

ΑΙΤΙΟΛΟΓΗΣΗ:
Η δυνατότητα ρύθμισης της έντασης των συναγερμών είναι περιοριστική χωρίς να προσδίδει οπωσδήποτε κλινικό ή θεραπευτικό όφελος για τον ασθενή, ενώ είναι χαρακτηριστικό το οποίο πληρείται από συγκεκριμένο κατασκευαστή και συνεπώς περιορίζει την συμμετοχή αξιόπιστων κατασκευαστών, με ηγετική θέση στην παγκόσμια αγορά.

(1) http://www.perinatalservicesbc.ca/NR/rdonlyres/B7C5A2AD-A7A4-45C4-ABBB-8B349D688B80/0/NBGuidelinesThermoregulation3.pdf
(2) https://www.nichd.nih.gov/cochrane_data/sinclairj_01/sinclairj_01.html
(3) http://www.ncbi.nlm.nih.gov/pubmed/11869590

Draeger Hellas A.E

Ελ. Βενιζέλου 150,
ΤΚ 142 31, Νέα Ιωνία
Ελλάδα
Τηλ : +30 210 2821809
Fax : +30 210 2821214

www.draeger.com

Draeger Hellas S.A

150, El. Venizelou Str.
142 31 , Nea Ionia
Greece
Tel : +30 210 2821809
Fax : +30 210 2821214

www.draeger.com

11) Το στρωματάκι του νεογνού να είναι διαστάσεων 45-65 cm, να είναι όσο το δυνατόν κοντά στα τοιχώματα της καλύπτρας η δε κλίση της κλίνης να ρυθμίζεται κατά ±12ο (Trendelemburg και reverse Trendelemburg) με εξωτερικούς περιστρεφόμενους μοχλούς.

Η προδιαγραφή 11 προτείνεται να διαμορφωθεί ως εξής:
Το στρωματάκι του νεογνού να είναι διαστάσεων 45-65 cm περίπου, να είναι όσο το δυνατόν κοντά στα τοιχώματα της καλύπτρας η δε κλίση της κλίνης να ρυθμίζεται κατά ±12ο (Trendelemburg και reverse Trendelemburg) με εξωτερικούς περιστρεφόμενους μοχλούς

ΑΙΤΙΟΛΟΓΗΣΗ:
Οι διαστάσεις του στρώματος της θερμοκοιτίδας είναι περιοριστικές χωρίς να προσδίδουν οπωσδήποτε κλινικό ή θεραπευτικό όφελος για τον ασθενή, εν αντιθέσει περιορίζουν την συμμετοχή αξιόπιστων κατασκευαστών, με ηγετική θέση στην παγκόσμια αγορά.

12) Η κλίνη να είναι ακτινοδιαπερατή και να διαθέτει την ειδική θήκη τοποθέτησης ακτινογραφικής κασέτας. Να σύρεται με ασφάλεια προς τα έξω και να εκτελεί το στρώμα περιστροφική κίνηση.

Η προδιαγραφή 12 προτείνεται να διαμορφωθεί ως εξής:
Η κλίνη να είναι ακτινοδιαπερατή και να διαθέτει την ειδική θήκη τοποθέτησης ακτινογραφικής κασέτας. Να σύρεται με ασφάλεια προς τα έξω, θα εκτιμηθεί η δυνατότητα να εκτελεί το στρώμα περιστροφική κίνηση.

ΑΙΤΙΟΛΟΓΗΣΗ:
Η περιστροφική κίνηση του στρώματος της θερμοκοιτίδας είναι περιοριστική χωρίς να προσδίδει οπωσδήποτε κλινικό ή θεραπευτικό όφελος για τον ασθενή, εν αντιθέσει περιορίζει την συμμετοχή αξιόπιστων κατασκευαστών, με ηγετική θέση στην παγκόσμια αγορά.
Η περιστροφική κίνηση είναι χαρακτηριστικό δύο (2) μόνο συγκεκριμένων κατασκευαστών.

18. Να δέχεται η να διαθέτει βρεφοζυγό ηλεκτρονικό του ιδίου κατασκευαστή με εύρος μετρήσεων από 500 gr, ακρίβεια ± 10 gr με βήματα 10 gr και ψηφιακή απεικόνιση των μετρήσεων και αποθήκευση στα trends.

Η προδιαγραφή 18 προτείνεται να διαμορφωθεί ως εξής:
Να δέχεται η να διαθέτει βρεφοζυγό ηλεκτρονικό του ιδίου κατασκευαστή με εύρος μετρήσεων από 500 gr, ακρίβεια ± 5 gr με βήματα 5 gr, το μέγιστο και ψηφιακή απεικόνιση των μετρήσεων και αποθήκευση στα trends.

ΑΙΤΙΟΛΟΓΗΣΗ:
Σε ένα πρόωρο 500 ή 600 γραμμαρίων η απόκλιση ακρίβειας ±10 γραμμάρια είναι αρκετά μεγάλη, το ίδιο ισχύει και για το εύρος των βημάτων. Για το λόγο αυτό προτείνουμε την μείωση της ακρίβειας του βρεφοζυγού και των βημάτων ρύθμισης σε 5 gr το μέγιστο.

Draeger Hellas A.E

Ελ. Βενιζέλου 150,
ΤΚ 142 31, Νέα Ιωνία
Ελλάδα
Τηλ.: +30 210 2821809
Fax: +30 210 2821214

www.draeger.com

Draeger Hellas S.A

150, El. Venizelou Str.
142 31 Nea Ionia
Greece
Tel.: +30 210 2821809
Fax: +30 210 2821214

www.draeger.com

British Columbia Reproductive Care Program

Newborn Guideline 2

NEONATAL THERMOREGULATION

1. DEFINITIONS

1.1 THERMOREGULATION

Thermoregulation is the ability to balance between heat production and heat loss in order to maintain body temperature within a certain "normal" range. This ability is very limited in the newborn.

1.2 HEAT PRODUCTION

Non-shivering thermogenesis, the production of heat by metabolism, is the primary source of heat production in the neonate. Brown fat (deposited after 28 weeks gestation principally around the scapulae, kidneys, adrenals, neck and axilla) is a thermogenic organ unique to the neonate.

1.3 HEAT LOSS

Heat loss occurs when heat is transferred to the surrounding environment. The four mechanisms of heat loss are:

- Evaporation: Loss of heat when water evaporates from the skin and respiratory tract.
- Convection: Heat loss to cooler surrounding air, dependent on air temperature and air movement.
- Conduction: Heat loss to cooler solid objects in direct contact with the body.
- Radiation: Heat loss to surrounding colder solid objects not in direct contact with the body.

1.4 NEUTRAL THERMAL ENVIRONMENT (NTE)

The thermal conditions required to ensure minimal metabolic expenditure of energy (as measured by oxygen consumption) to maintain normal body temperature. For the neonate the normal temperature range is approximately: 36.6 – 37.2°C. (See Appendix A: Management and Use of Heating Devices used to Maintain Infant's Temperature and Appendix B: Recommended Ranges for Incubator Temperatures).

2. RELEVANCE

Cold stress and hyperthermia may have serious metabolic consequences for all newborns. In small for gestational age and preterm infants (<2500 g), these consequences may be devastating and may increase both mortality and morbidity rates.

2.1 COLD STRESS MAY RESULT IN

- Increased metabolic rate, leading to increased O_2 consumption
- Increased caloric consumption and decreased glycogen stores
- Development of acidosis due to pulmonary vasoconstriction
- Thermal shock and DIC (in the more serious cases), progressing to death

2.2 *HYPER*THERMIA MAY RESULT IN

- Vasodilatation
- Increased metabolic rate
- Increased fluid loss

3. RISK FACTORS

- All neonates in the first 8 – 12 hours of life
- Prematurity
- Small for gestational age
- Infants with CNS problems
- Prolonged resuscitation efforts
- Sepsis

4. PREVENTIVE MEASURES

4.1 AT DELIVERY

- Dry the baby thoroughly immediately after birth and remove wet blankets.
- Place a cap on the baby's head (the most significant area of heat loss for the infant).
- Place in "skin to skin" contact with mother and cover baby with warm blankets, OR
- Bundle in warm blankets and give the baby to mother to hold, OR
- Place naked under a pre-heated radiant source.
- Cover the scales with warm cloth or diaper.
- Transfer sick or unstable infant to pre-warmed incubator as soon as possible.

4.2 CONTINUING CARE

A. Healthy Term Newborns

- Warm hands and stethoscope prior to contact with baby.
- Pre-warm beds, linen and examining tables, when possible.
- Position cot/incubator away from outside walls, windows and drafts.
- Delay initial bath until body temperature has stabilized (minimum 3 normal readings one hour apart).
- Tub bath rather than sponge bath and dry quickly.

B. Low Birth Weight or Compromised Infants (See Newborn Guideline 3: Stabilization of the Asphyxiated Infant)

- Provide a neutral thermal environment (See Appendix A: Management and Use of Heating Devices used to Maintain Infant's Temperature and Appendix B: Recommended Ranges for Incubator Temperatures).
- Administer humidified air or O_2 warmed to recommended incubator temperature (See Appendix B: Recommended Ranges for Incubator Temperatures).
- Do not bath infant (may need to wipe infant immediately after birth if maternally transferred infection suspected to reduce risk to health care workers).

5. DIAGNOSIS

Diagnosis of hypothermia or hyperthermia is made by taking the baby's temperature. Axillary temperatures (using a tympanic or electronic thermometer) may be used provided there is consistency in the method chosen. Rectal temperatures are not recommended as they provide a late indication of cold stress and may cause rectal trauma.

5.1 SIGNS OF HYPOTHERMIA

- Apneic spells
- Lethargy
- Mottled, pale skin
- Cold extremities (< 1 degree C from central temperature)

5.2 SIGNS OF HYPERTHERMIA

- Tachypneic
- Diaphoretic
- Flushed, bright pink skin

6. MANAGEMENT OF NEONATAL HYPOTHERMIA

6.1 STABILIZE TEMPERATURE

- Determine cause of hypothermia and treat appropriately (abnormal neonatal temperatures may be caused by disease processes or environmental conditions).
- Place sick term or preterm infants in incubators or under radiant heaters (See Appendix A: Management and Use of Heating Devices used to Maintain Infant's Temperature).
- For sick term and preterm infants use NTE Chart to determine incubator temperature (See Appendix B: Recommended Ranges for Incubator Temperatures).
- Monitor environmental temperature.
- Monitor axillary and skin temperature at least every hour until infant's temperature becomes normal.

6.2 MONITOR FOR COMPLICATIONS

- Observe for respiratory problems (cold infants have a significantly higher incidence).
- Monitor vital signs.
- Monitor urine output (low perfusion may cause renal impairment).
- Consider complications affecting other organ systems, e.g. cardiovascular.
- Monitor blood sugars (See Newborn Guideline 5: Neonatal Hypoglycemia).
- Monitor blood gases prn.

SUGGESTED READINGS

Bruggemeyer, A. Neonatal thermoregulation. In C. Kenner, A. Brueggemeyer, & L.P. Gunderson (Eds.), Comprehensive neonatal nursing: A physiologic perspective (pp. 247-262). Philadelphia: W.B. Saunders Co.

Desmond M., et al. The Transitional Care Nursery. The Pediatric Clinics of North America 1996; Vol. 13 No. 3.

Gardner S. Merenstein G. Handbook of Neonatal Intensive Care, Toronto, 1993.

Guerina, N.G. Bacterial and fungal infections. In J.P. Cloherty & A.R. Stark (Eds.), Manual of neonatal care (4th ed). (pp.271-300). Philadelphia, Libbincott-Raven.

Infant Radiant Warmers. Canadian Paediatric Society Statement AAP 80-01.

National Association of Neonatal Nurses. Neonatal Thermoregulation: Guidelines for practice. (1997). Petaluma, California.

Neonatal Thermoregulation. NAACOG – OGN Nursing Practice Resource, February 1990.

Ogren, J.M. The Inaccuracy of Axillary Temperature Measure with an Electronic Thermometer. AJDC January 1990; 144.

Reproductive Care Program of Nova Scotia. Neonatal Environmental Control. Nursery Manual 1:37-41.

APPENDIX A

MANAGEMENT AND USE OF HEATING DEVICES USED TO MAINTAIN INFANT'S TERMPERATURES

I. RADIANT WARMERS

Servo-controlled radiant warmers are recommended.

- Attach the servo-controlled probe to the upper right quadrant of the abdomen and/or on whichever surface is closest to the radiant source. The probe should be attached firmly to the skin with a reflective disc visible for inspection at all times.
- Set the Servo control to 36.5 degrees C.
- Monitor the infant's temperature, respiratory rate, heart rate and blood pressure q5mins when rewarming a hypothermic infant. **Note**: the skin probe temperature will read 36.5 degrees C *before* the infant's core temperature in normal.
- Do not dress or bundle the infant.
- Assess and adjust the newborn's fluid requirements. Fluids may need to be increased by as much as 30% to compensate for insensible water loss.

II. INCUBATORS

- Adjust incubator temperature to recommended guidelines (See Appendix B) as the infant's temperature nears normal.
- Record incubator temperature hourly.
- Servo-control mode may be used.
- Sick newborns and small prematures may benefit from the use of a double walled incubator, heat shield or supplementary humidity.
- **When rewarming a hypothermic infant, set the incubator temperature to 1-1.5 degrees above the infant's temperature.**
- **Adjust the temperature q30 minutes until the infant is warmed.**

APPENDIX B

RECOMMENDED RANGES FOR INCUBATOR TEMPERATURES

RANGE OF OPTIMAL INCUBATOR TEMPERATURES (°C) Birth Weight Group					
Age	**< 1000 gm**	**1000 – 1500 gm**	**1500 – 2000 gm**	**2000 – 2500 gm**	**2500 gm + 36 weeks**
0 – 6 hr	36.7 – 36.2	36.2 – 35.4	35.7 – 34.2	34.8 – 33.6	34.8 – 32.7
6 – 12 hr	36.7 – 36.0	36.2 – 35.4	35.7 – 34.1	34.8 – 33.0	34.8 – 32.0
12 – 36 hr	36.6 – 35.9	36.0 – 35.2	35.6 – 34.1	34.7 – 32.5	34.7 – 31.6
24 – 36 hr	36.5 – 35.9	35.9 – 35.1	35.5 – 34.0	34.7 – 32.3	34.4 – 31.2
36 – 48 hr	36.5 – 35.9	35.9 – 35.0	35.4 – 33.9	34.6 – 32.0	34.2 – 31.0
48 – 72 hr	36.4 – 35.8	35.9 – 34.8	35.2 – 33.6	34.4 – 31.8	34.1 – 30.6
72 – 96 hr	36.3 – 35.7	35.8 – 34.7	35.1 – 33.5	34.2 – 31.7	33.6 – 30.2
4 – 5 days	36.3 – 35.6	35.7 – 34.4	35.0 – 33.3	34.1 – 31.6	33.4 – 29.9
5 – 6 days	36.2 – 35.5	35.6 – 34.3	34.9 – 33.2	33.9 – 31.6	33.1 – 29.8
6 – 8 days	36.0 – 35.2	35.5 – 34.1	34.8 – 33.0	33.8 – 31.6	32.5 – 29.3
8 – 10 days	35.9 – 35.1	35.2 – 34.0	34.6 – 32.8	33.5 – 31.6	32.5 – 29.3
10 – 12 days	35.8 – 34.9	35.0 – 33.9	34.4 – 32.7	33.4 – 31.6	32.0 – 29.3
12 – 14 days	35.7 – 34.7	35.0 – 33.4	34.3 – 32.6	33.3 – 31.6	31.4 – 29.3
2 – 3 weeks	35.6 – 34.1	35.0 – 33.0	34.2 – 32.4	33.2 – 31.0	–
3 – 4 weeks	35.2 – 33.6	34.6 – 32.3	34.1 – 32.0	33.0 – 30.4	–
4 – 5 weeks	34.7 – 33.3	33.9 – 31.8	33.9 – 31.5	32.6 – 29.9	–
5 – 6 weeks	–	33.1 – 31.0	–	31.8 – 29.3	–

NOTE: No single temperature is a full statement of the thermal environment of the baby.

A. Conditions for which above temperature ranges apply:

1. Single – walled incubator
2. Incubator relative humidity approximately 50%
3. Incubator air temperature measured directly over the baby's chest
4. Nursery temperature 26.5°C (80°F)
5. Draft – free surroundings

B. Conditions which will necessitate changes in incubator temperature:

1. Use of thermometer in the corner of incubator	Subtract 0.5° - 1.0°C
2. Phototherapy	Subtract 1.0° - 1.5°C
3. Room temperature - 30°C - 23°C	Subtract 0.5°C Add 0.5°C
4. Incubator humidity 100%	Subtract 0.5°C
5. Proximity of incubator to heat sources or cold, windows etc.	Add or subtract (Variable)
6. Double – walled incubator, in a heat shield	Subtract (Variable)
7. Hyperthermia	Subtract (Variable)

C. Smaller, sicker infants will require incubator temperatures at the upper part of the ranges
Higher temperatures may be necessary to maintain an axillary temperature of 36.3° C to 37.2° C.

Adapted from Scopes & Ahmed (1996), Hey & Katz (1971) and Oliver (1971) Revised: Dec. 1991

Cochrane Neonatal Reviews

Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants

Authors

John C Sinclair[1]

Background - Methods - Results - Characteristics of Included Studies - References - Data Tables & Graphs

[1]Departments of Pediatrics and Clinical Epidemiology and Biostatistics, McMaster University, Hamilton, Canada [Top]

Citation example: Sinclair JC. Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants. Cochrane Database of Systematic Reviews 2002, Issue 1. Art. No.: CD001074. DOI: 10.1002/14651858.CD001074.

Contact person

John C Sinclair

Departments of Pediatrics and Clinical Epidemiology and Biostatistics
McMaster University
1200 Main Street West
Room 3N11F
Hamilton Ontario L8N 3Z5
Canada

E-mail: sinclair@mcmaster.ca

Dates

Assessed as Up-to-date:	14 April 2008
Date of Search:	06 April 2008
Next Stage Expected:	14 April 2010
Protocol First Published:	Issue 2, 1998
Review First Published:	Issue 2, 1998
Last Citation Issue:	Issue 1, 2002

What's new

Date / Event	Description
18 April 2008 **Updated**	This updates the review "Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants", published in the Cochrane Database of Systematic Reviews, Issue 4, 2004 (Sinclair 2004). An updated search identified one new possibly eligible trial (Genzel-Boroviczeny 2007). This trial was not eligible for inclusion and has been added to excluded trials. Conclusions unchanged.
11 April 2008 **Amended**	Converted to new review format.

History

Date / Event	Description
17 November 2004 **Updated**	No new eligible trials
26 November 2001 **New citation: conclusions changed**	Substantive amendment

Abstract

Background

Randomized trials have shown that the neonatal mortality rate of low birth-weight babies can be reduced by keeping them warm. For low birth-weight babies nursed in incubators, warm conditions may be achieved either by heating the air to a desired temperature, or by servo-controlling the baby's body temperature at a desired set-point.

Objectives

In low birth weight infants, to determine the. Effect on death and other important clinical outcomes of targeting body temperature rather than air temperature as the end-point of control of incubator heating.

Search methods

Standard search strategy of the Cochrane Neonatal Review Group. Searches were made of the Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library, Issue 3, 2004) and MEDLINE, 1966 to April 2008.

Selection criteria

Randomized or quasi-randomized trials which test the effects of having the heat output of the incubator servo-controlled from body temperature compared with setting a constant incubator air temperature.

Data collection and analysis

Trial methodologic quality was systematically assessed. Outcome measures included death, timing of death, cause of death, and other clinical outcomes. Categorical outcomes were analyzed using relative risk and risk difference. Meta-analysis assumed a fixed effect model.

Results

Two eligible trials were found. In total, they included 283 babies and 112 deaths. Compared to setting a constant incubator air temperature of 31.8C, servo-control of abdominal skin temperature at 36C reduces the neonatal death rate among low birth weight infants: relative risk 0.72 (95% CI 0.54, 0.97); risk difference -12.7% (95% CI -1.6, -23.9). This effect is even greater among VLBW infants.

Authors' conclusions

During at least the first week after birth, low birth weight babies should be provided with a carefully regulated thermal environment that is near the thermoneutral point. For LBW babies in incubators, this can be achieved by adjusting incubator temperature to maintain an anterior abdominal skin temperature of at least 36C, using either servo-control or frequent manual adjustment of incubator air temperature.

Plain language summary

Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants

Low birth weight babies have a higher chance or survival if they are kept warm. The right conditions can be made by placing the baby in an incubator. The air can be heated to a desired temperature, or radiant heat lamps inside the incubator can adjust to the baby's body temperature (servo-control). The review of trials found that keeping a baby's skin temperature at 36C degrees by servo-control reduces the newborn death rate in low birth weight babies rather than setting a constant incubator temperature of 31.8C. More research is needed.

[top]

Background

Survival of low birth weight infants is increased by keeping them warm. The question of "how warm" has been addressed in randomized trials which compared a higher vs lower incubator air temperature. Silverman 1958 compared the effects on survival of a warmer condition (air temperature 31.7C, range 31.1-32.2) versus a cooler condition (air temperature 28.9C, range 28.3-29.4). Survival of low birth weight infants was enhanced in the warmer condition. Jolly 1962 found similar results.

The warmer conditions tested in these trials were still below the range of "thermoneutral" air temperatures for newborn infants, which Bruck 1961 determined to be 32-34C. Moreover, the body temperatures of the infants comprising Silverman's warmer group, especially of those under 1500 g birth weight, were lower than the body temperatures which Silverman 1966 found to be associated with minimal rates of oxygen consumption. Thus, it remained possible that even warmer or more finely regulated thermal conditions might further improve survival of low birth weight infants.

It became possible to test this hypothesis with the advent of a new incubator which incorporated radiant heat lamps whose output could be servo-controlled from the infant's skin temperature.

Objectives

In low birth weight infants, to determine the effects on death and other important clinical outcomes of targeting body temperature rather than air temperature as the end-point of control of incubator heating.

[top]

Methods

Criteria for considering studies for this review

Types of studies

Randomized or quasi-randomized controlled trials which test the effects of incubator heating servo-controlled from body temperature compared with control of incubator air temperature.

Types of participants

Low birth weight infants, enrolled in the early neonatal period.

Types of interventions

Servo-control of incubator heating, using the baby's body temperature as the end-point of thermal control, compared with air temperature control.

Types of outcome measures

Death
Death by postnatal age period
Death by birth weight group
Other important clinical outcomes

Search methods for identification of studies

This review used the search strategy of the Cochrane Neonatal Collaborative Review Group. Searches were made of the Oxford Database of Perinatal Trials, the Cochrane Neonatal Group's Neonatal Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL, The Cochrane Library, Issue 3, 2004) and MEDLINE. MEDLINE was searched for the period 1966 to 1997, and the search was updated in November 2001, June 2004 and April 2008, using the terms: exp temperature or body temperature or skin temperature or body temperature regulation, or oxygen consumption or exp energy intake, or incubator, infant or neonatal nursing or radiant (tw) and warm: (tw) and clinical trial and infant, premature or infant, low birth weight. Forward searches of Science Citation Index for citations of the two included trials, Buetow 1964 and Day 1964, were done for the period 1965 through 1998, and this was updated in June 2004, and again in April 2008.

Data collection and analysis

The standard method was used for conducting a systematic review, as described in the Cochrane Collaboration Handbook. Each included trial was assessed for blinding of randomization, blinding of the intervention, completeness of followup, and blinding of the outcome assessment. Categorical outcomes were analyzed using relative risk and risk difference, with their 95% confidence intervals. A fixed effect model was assumed for meta-analysis.

[top]

Results

Description of studies

Two trials were found which met inclusion criteria: Buetow 1964 and Day 1964. The clinical details for each trial are given in the table, Characteristics of Included Studies. One additional possibly eligible trial was detected in the update of April 2008, but was excluded (Genzel-Boroviczeny 2007). This was a randomized cross-over trial in preterm infants which compared an incubator air temperature required to achieve an anterior abdominal wall skin temperature of 36.5C with that required to obtain a difference between abdominal wall and extremities of less than 2C. The reasons for exclusion of this trial are given in the Table of Excluded Studies.

Risk of bias in included studies

Day 1964 was a randomized trial, whereas Buetow 1964 was quasi-randomized in that allocation to the experimental group depended on the availability of the servo-controlled incubator at the time of the baby's admission. In addition, when twins were admitted to Buetow's trial, the first-born was systematically allocated to the servo-controlled incubator if it was available, and the second-born therefore entered the control group. For the trial as a whole, this resulted in imbalance between the two exposure groups for second-born twins, and they were excluded from the analysis in the report of Buetow and in this review. (For further details of trial quality and quality assessments, see table, Characteristics of Included Studies.)

Effects of interventions

Servo-control of abdominal skin temperature vs air control (Comparison 1)

Death (Outcome 1.1):

Among all babies enrolled, both Buetow 1964 and Day 1964 found that death rate tended to be lower in the group servo-controlled at 36C, but in neither trial did the difference reach statistical significance. However, the meta-analysis shows that servo-control at 36C substantially and statistically significantly lowers death rate, relative risk 0.72 (95% CI 0.54, 0.97); risk difference -12.7% (95% CI -1.6, -23.9).

Death (very low birth weight) (Outcome 1.2):

An analysis was done which was restricted to the lowest birth weight infants (Buetow, 1000-1500 g; Day 800-1599 g). Day found the death rate to be significantly reduced in these infants: relative risk 0.37 (95% CI 0.17, 0.83), whereas Buetow found a trend in the same direction which was not statistically significant. The meta-analysis shows that servo-control at 36C substantially and statistically significantly lowers death rate: relative risk 0.66 (95% CI 0.48, 0.90); risk difference -17.8% (95% CI -5.2, -30.3).

Time of death:

Buetow 1964 used life table statistics to analyze the effect of treatment group on time of death. It was noted that the greatest reductions in mortality occurred between the 2nd and 14th day of life.

Cause of death:

In both Buetow 1964 and Day 1964, the distribution of principal findings at necropsy was not different between the two exposure groups.

Other outcomes:

Buetow 1964 assessed infants' thermal stability after the servo-controlled incubator had been discontinued at 96 hours. Compared to the control infants, significantly more of the experimental group were able to maintain axillary temperatures of 35C or greater during the 5th, 6th and 7th days of life.

Discussion

The two trials which qualified for inclusion in this review were closely similar as regards the participants who were enrolled and in the thermal exposures which were tested. The meta-analysis of the results shows a very important reduction in death rate of low birth weight infants attributable to servo-control of abdominal skin temperature at 36C. The effect is particularly important in very low birth weight babies during the early neonatal period. The mechanism of the thermal effect in reducing death rates was not uncovered in these trials. The causes of death were not different between the two exposure groups.

No adverse biologic consequences of the close-to-thermoneutral exposure achieved by servo-control at 36C were noted in these trials. Buetow 1964 assessed temperature regulation of infants after their removal at 96 hours from the servo-controlled condition and found that they were actually better than the control infants at maintaining axillary temperatures of >35C during days 5-7. However, it should be noted that Glass 1968 and Glass 1969 showed that more prolonged (2-week) exposure of VLBW infants to a servo-controlled thermoneutral environment resulted in a reduction in their subsequent thermal stability in the face of a mild cold stress. The early and late effects of providing graded cold stimulation during the late neonatal period (i.e. after the time when the survival advantage of thermoneutrality has been shown) should be addressed in future trials. In particular, the possible effect of postnatal thermal stimulation of brown fat metabolism on later diet-induced thermogenesis should be investigated.

The particular incubators which were tested in these trials, which supplied supplementary heat using servo-controlled radiant heat lamps mounted on top of the incubator hood, are no longer being manufactured. Accidental dislodgement of the skin thermister used in servo-control can result in accidental overheating of the baby - a particularly serious problem when the servo-controlled heat source is a powerful radiant heater. Presently available incubators which incorporate servo-control use convective heating. Since there is no evidence that the route of heat transfer is itself critical in achieving thermoneutrality, the survival advantage shown with the particular incubators used in these trials can be expected to occur also with servo-controlled convective heating.

It should be noted that the set-point of 36C abdominal skin temperature which was chosen in these trials may be still slightly below the temperature required for strict thermoneutrality. Silverman 1966 estimated that minimal rates of oxygen consumption in VLBW infants occur when abdominal skin temperature is regulated at between 36-37C. When servo-control incubators are used in present-day care of VLBW infants in the first days of postnatal life, an abdominal skin temperature of 36.5C is recommended as the set-point to achieve thermoneutrality.

The possible benefits of "therapeutic" hypothermia in specific clinical circumstances were not investigated in the trials reviewed here. Cooling for term newborns with moderate or severe post-asphyxial hypoxic-ischemic encephalopathy has been investigated in recent trials. In this specific population, cooling has been shown to reduce both the death rate, and major neurodevelopmental disability among survivors (Jacobs 2007).

Authors' conclusions

Implications for practice

Servo-control of abdominal skin temperature at 36C reduces neonatal death rate in LBW infants, compared with air temperature control at 31.8C. During at least the first week after birth, LBW babies should be provided with a carefully regulated thermal environment. An abdominal skin temperature of 36C may be slightly below the temperature required for strict thermoneutrality in LBW babies. If thermoneutrality is the goal, incubator heating for such infants should be adjusted to maintain abdominal skin temperature at approximately 36.5C, using either servo-control or frequent manual adjustment.

Implications for research

The early and late effects of providing graded cold stimulation during the late neonatal period (i.e. after the time when the survival advantage of thermoneutrality has been shown) should be addressed in future trials in low birth weight infants.

Potential conflict of interest

- None noted.

[top]

Characteristics of studies

Characteristics of Included Studies

Buetow 1964

Methods	Quasi-random allocation (dependent on availability of servo-controlled incubator). Blinding of allocation - no. Blinding of intervention - no. Complete follow-up - no. Blinding of outcome assessment - not relevant for death (all causes), can't tell for other outcomes.
Participants	181 very low birth weight newborn infants, birth weight range 1000-1500 g.
Interventions	Experimental group: servo-control of abdominal skin temperature at 36C using radiant heat, from admission for first 96 hours; then standard incubator providing ambient T 31.1-32.2C. Control group: standard incubator providing ambient T 31.1-32.2C.
Outcomes	Deaths from admission to day 28. Deaths by postnatal age interval. Cause of death. Temperature regulation after removal from servo-controlled incubator.
Notes	Second-born twins excluded from analysis: 5 of 94 experimental and 18 of 87 control infants were excluded on this basis.

Risk of bias table

Item	Judgement	Description
Allocation concealment?	No	C - Inadequate

Day 1964

Methods	Randomized trial. Blinding of allocation - yes (for first part of study); no (for second of pair in last part of study). Blinding of intervention - no. Completeness of follow-up - can't tell. Blinding of outcome assessment - not relevant for death (all causes); can't tell for other outcomes.
Participants	125 low birth weight newborn infants weighing 600-1999 g. Later in the study admission was limited to those weighing 750-1749 g.

Interventions	Experimental group: servo-control of abdominal skin temperature at 36C using radiant heating, incubator air temperature 31.8C (range 31.1-32.2C); trial conditions maintained from admission until 1750 g or, if < 1750 g BW, until BW regained. Control group: incubator air temperature 31.8C (range 31.1-32.2C).
Outcomes	Death until hospital discharge. Duration of life among deaths. Cause of death. Axillary temperature range.
Notes	In first part of trial, randomization was done using table of random numbers, sealed envelopes; in second part of trial, coin toss was used, with next infant assigned to other group. Infants dying within 12 hours of birth were removed from the trial; number and numbers by group are not given.

Risk of bias table

Item	Judgement	Description
Allocation concealment?	Yes	A - Adequate

Characteristics of excluded studies

Genzel-Boroviczeny 2007

Reason for exclusion	Outcomes limited to physiologic variables (vital signs, microvascular perfusion indices), measured very shortly (10 minutes) after reaching target thermal condition. No clinical outcomes assessed.

Horns 2002

Reason for exclusion	No clinical outcomes assessed.

Perlstein 1976

Reason for exclusion	Controls identified retrospectively.

[top]

References to studies

Included studies

Buetow 1964

Buetow KC, Klein SW. Effect of maintenance of "normal" skin temperature on survival of infants of low birth weight. Pediatrics 1964;34:163-70.

Day 1964

Day RL, Caliguiri L, Kamenski C, Ehrlich F. Body temperature and survival of premature infants. Pediatrics 1964;34:171-81.

Excluded studies

Genzel-Boroviczeny 2007

Genzel-Boroviczény O, Seidl T, Rieger-Fackeldey E, Abicht J, Christ F. Impaired microvascular perfusion improves with increased incubator temperature in preterm infants. Pediatric Research 2007;61:239-42.

Horns 2002

Horns KM. Comparison of two microenvironments and nurse caregiving on thermal stability of ELBW infants. Advances in Neonatal Care 2002;2:149-60.

Perlstein 1976

Perlstein PH, Edwards NK, Atherton HD, Sutherland JM. Computer-assisted newborn intensive care. Pediatrics 1976;57:494-502.

Studies awaiting classification

- None noted.

Ongoing studies

- None noted.

Other references

Additional references

Bruck 1961

Bruck K. Temperature regulation in the newborn infant. Biology of the Neonate 1961;3:65-119.

Glass 1968

Glass L, Silverman WA, Sinclair JC. Effect of the thermal environment on cold resistance and growth of small infants after the first week of life. Pediatrics 1968;41:1034-46.

Glass 1969

Glass L, Silverman WA, Sinclair JC. Relationship of thermal environment and caloric intake to growth and resting metabolism in the late neonatal period. Biology of the Neonate 1969;14:324-40.

Jacobs 2007

Jacobs S, Hunt R, Tarnow-Mordi W, Inder T, Davis P. Cooling for newborns with hypoxic ischaemic encephalopathy. Cochrane Database of Systematic Reviews 2007, Issue 4. Art. No.: CD003311. DOI: 10.1002/14651858.CD003311.pub2.

Jolly 1962

Jolly H, Molyneux P, Newell DJ. A controlled study of the effect of temperature on premature babies. Journal of Pediatrics 1962;60:889-94.

Silverman 1958

Silverman WA, Fertig JW, Berger AP. The influence of the thermal environment on the survival of newly born premature infants. Pediatrics 1958;22:876-86.

Silverman 1966

Silverman WA, Sinclair JC, Agate FJ. The oxygen cost of minor changes in heat balance of small newborn infants. Acta Paediatrica Scandinavica 1966;55:294-300.

Other published versions of this review

Sinclair 1992

Sinclair JC. Management of the thermal environment. In: Sinclair JC, Bracken MB, editor(s). Effective Care of the Newborn Infant. Oxford: Oxford University Press, 1992:40-58.

Sinclair 2000

Sinclair JC. Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants. Cochrane Database of Systematic Reviews 2000, Issue 1.

Sinclair 2002

Sinclair JC. Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants. Cochrane Database of Systematic Reviews 2002, Issue 1. Art. No.: CD001074. DOI: 10.1002/14651858.CD001074.

Sinclair 2004

Sinclair JC. Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants. Cochrane Database of Systematic Reviews 2004, Issue 4. Art. No.: CD001074. DOI: 10.1002/14651858.CD001074.

Classification pending references

Data and analyses

1 Servo-control of abdominal skin temperature vs air control

Outcome or Subgroup	Studies	Participants	Statistical Method	Effect Estimate
1.1 Death	2	283	Risk Ratio (M-H, Fixed, 95% CI)	0.72 [0.54, 0.97]
1.2 Death (very low birth weight)	2	228	Risk Ratio (M-H, Fixed, 95% CI)	0.66 [0.48, 0.90]

[top]

Sources of support

Internal sources

- McMaster University, Canada

External sources

- National Institute of Child Health and Human Development, USA

Cochrane Database Syst Rev. 2002;(1):CD001074.

Servo-control for maintaining abdominal skin temperature at 36C in low birth weight infants.

Sinclair JC.

Author information

Abstract

BACKGROUND: Randomized trials have shown that the neonatal mortality rate of low birth-weight babies can be reduced by keeping them warm. For low birth-weight babies nursed in incubators, warm conditions may be achieved either by heating the air to a desired temperature, or by servo-controlling the baby's body temperature at a desired set-point.

OBJECTIVES: In low birth weight infants, to determine the effect on death and other important clinical outcomes of targeting body temperature rather than air temperature as the end-point of control of incubator heating.

SEARCH STRATEGY: Standard search strategy of the Cochrane Neonatal Review Group. Searches were made of the Cochrane Controlled Trials Register (CCTR) (Cochrane Library, Issue 4, 2001) and MEDLINE, 1966 to November 2001.

SELECTION CRITERIA: Randomized or quasi-randomized trials which test the effects of having the heat output of the incubator servo-controlled from body temperature compared with setting a constant incubator air temperature.

DATA COLLECTION AND ANALYSIS: Trial methodologic quality was systematically assessed. Outcome measures included death, timing of death, cause of death, and other clinical outcomes. Categorical outcomes were analyzed using relative risk and risk difference. Meta-analysis assumed a fixed effect model.

MAIN RESULTS: Two eligible trials were found. In total, they included 283 babies and 112 deaths. Compared to setting a constant incubator air temperature of 31.8C, servo-control of abdominal skin temperature at 36C reduces the neonatal death rate among low birth weight infants: relative risk 0.72 (95% CI 0.54, 0.97); risk difference -12.7% (95% CI -1.6, -23.9). This effect is even greater among VLBW infants.

REVIEWER'S CONCLUSIONS: During at least the first week after birth, low birth weight babies should be provided with a carefully regulated thermal environment that is near the thermoneutral point. For LBW babies in incubators, this can be achieved by adjusting incubator temperature to maintain an anterior abdominal skin temperature of at least 36C, using either servo-control or frequent manual adjustment of incubator air temperature.

Update of

Cochrane Database Syst Rev. 2000;(2):CD001074.

PMID: 11869590 [PubMed - indexed for MEDLINE]

Publication Types, MeSH Terms

LinkOut - more resources

PubMed Commons

PubMed Commons home

0 comments

How to join PubMed Commons