SOCIEDAD ARGENTINA DE PEDIATRÍA

Dirección de Congresos y Eventos

Por un niño sano
en un mundo mejor

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3º Jornadas Nacionales de Medicina Interna Pediátrica

2º Jornadas Nacionales de Enfermería en Medicina Interna Pediátrica

1º Jornadas de Kinesiología en Medicina Interna Pediátrica

1º Jornadas de Farmacia Pediátrica Hospitalaria

8 al 11 de Agosto de 2012

Sede:

Centro de Docencia y Capacitación Pediátrica Dr. Carlos A. Gianantonio – Salguero 1244– Ciudad de Buenos Aires

PRO / CON

11:30 a 12:30

Aula 1 (PB)

Mesa Redonda Pro / Con: Bronquiolitis: ¿intervenir kinésicamente o no?

Coordinador: Lic. Dardo **FRACHIA**

Secretaria: Lic. María del Pilar **GONZÁLEZ**

Panelistas

Lic. Gustavo **OLGUÍN:** CON

Lic. María Alejandra **TIMONI:** PRO

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Medicina Basada en Evidencias (MBE)

Es la utilización consciente, explícita y la previa evaluación de la mejor certeza científica, para tomar decisiones relacionadas con el cuidado de la salud de las personas

Sackett D.L., Scott Richardson W., Rosenberg W., Gayness R.B. Evidence – Based Medicine. How to Practice and Teach EBM. Churchill Livingstone. 1997.

Medicina Basada en Evidencias (MBE)

Si sólo se tuviera en cuenta la experiencia profesional se perderían todos los avances que la ciencia nos ofrece día a día para mejorar la salud de las personas y las comunidades.

Sin la experiencia profesional una excelente evidencia externa podría ser inaplicable o inapropiada para un paciente individual, o para grupos humanos de distintas características culturales, socioeconómicas o epidemiológicas.

Ellis J, Mulligan I, Rowe J,Sackett D.L. Impatient general medicine is evidence based. Lancet 1995;346:407-10

1078 *Archives of Disease in Childhood*, 1985, **60**

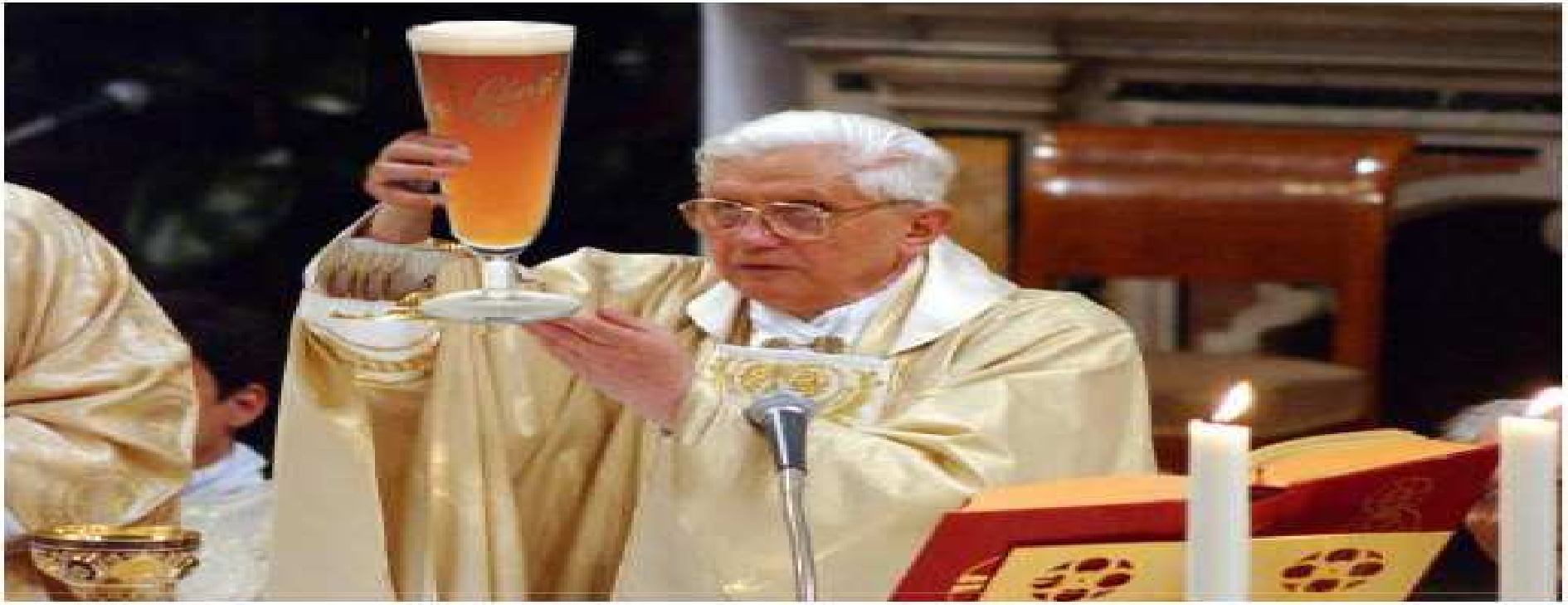
Chest physiotherapy in acute bronchiolitis

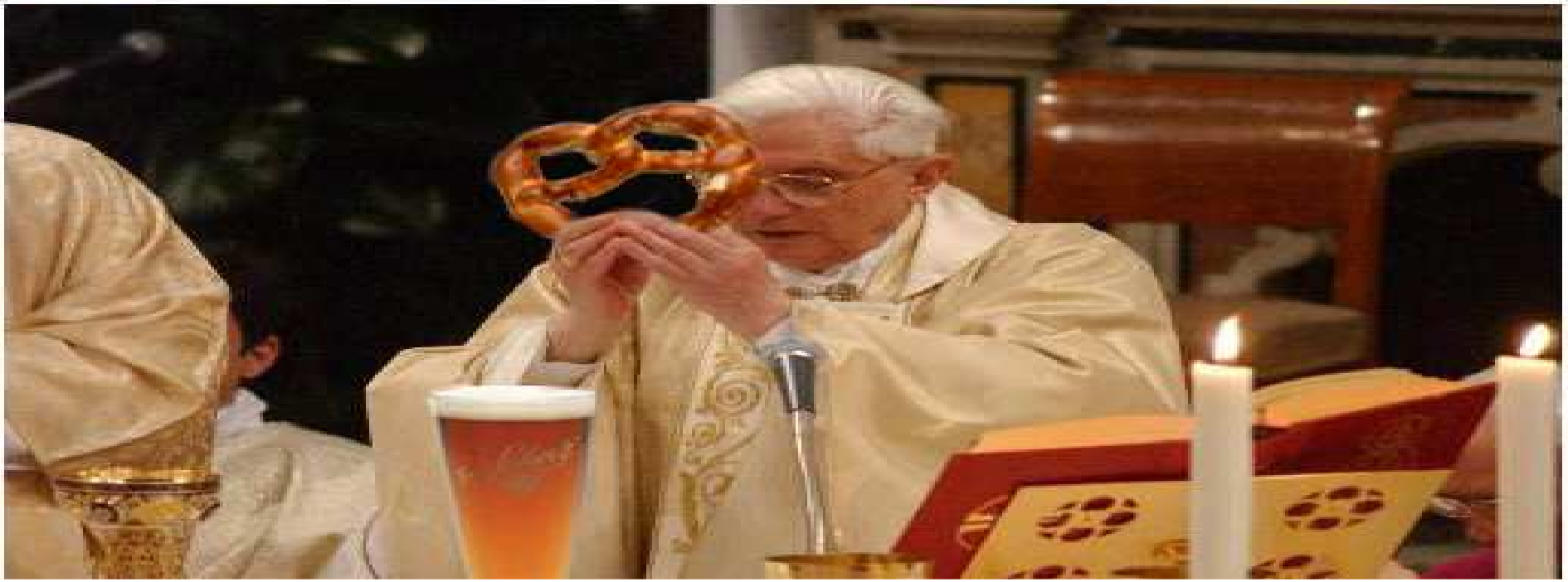
M S C WEBB, J A MARTIN, P H T CARTLIDGE, Y K NG, AND N A WRIGHT

Departments of Paediatrics and Physiotherapy, City Hospital, Hucknall Road, Nottingham

SUMMARY Forty four children with acute bronchiolitis were given twice daily chest physiotherapy in addition to standard supportive measures and were compared with 46 controls who were not given physiotherapy. There was no clinically discernable benefit on the course of their illness.

Chest physiotherapy requires considerable handling, and as we have been unable to show any benefit from its use, we recommend that physiotherapy should not be used routinely in the management of acute bronchiolitis.





ARTICULO ORIGINAL

MEDICINA (Buenos Aires) 2004; 64: 198-200

INDICACION DE LA FISIOTERAPIA RESPIRATORIA CONVENCIONAL EN LA BRONQUIOLITIS AGUDA

LILIANA BOHE[1], MARIA ELISA FERRERO[1], EDUARDO CUESTAS[2], LAURA POLLIOTTO[1], MARIZA GENOFF[1]

[1] *Sección de Terapia Respiratoria,* [2] *Servicio de Pediatría,Hospital Privado de Córdoba*

Los pacientes, a su admisión fueron divididos en dos grupos: a) Grupo de tratamiento: a quienes se les realizó fisioterapia torácica (drenaje, percusiones, vibraciones y aspiraciones nasofaríngeas, y b) Grupo control: a los que se les efectuó sólo aspiración nasofaríngea.

El grupo control presen
al promedio en los día
para el grupo control, p
en el manejo de la bro

en el manejo de la bronquiolitis. Esta terapéutica en bronquiolitis aguda puede no ser útil o aun ser perjudicial por incremento de la obstrucción bronquial, la desaturación, y distrés en el niño, evidenciado durante e inmediatamente después del tratamiento[3].

spectivamente. Respecto
iento y de 3.87 (± 1,30)
eficio en su uso rutinario

Bronq … n
del tra … videncia

F. Martinón-T …

Servicio de Crític … tiago de Compostela.

TABLA 3. **Resumen de los grados de recomendación de los diferentes tratamientos teóricamente aplicables en un primer episodio de bronquiolitis aguda en un lactante previamente sano, basados en los niveles de evidencia actualmente existentes**

Intervención terapéutica	Grado de recomendación
Soporte: monitorización + oxígeno + hidratación	B
Fisioterapia respiratoria	D*
Ventilación mecánica	A
Surfactante exógeno	D*
Óxido nítrico	E
Ventilación de alta frecuencia oscilatoria	D*
Oxigenación de membrana extracorpórea	C

*Intervenciones terapéuticas que podrían mejorar su nivel de recomendación si se acumularan nuevas evidencias con estudios aleatorios controlados de alta calidad.

FISIOTERAPIA

Aunque se emplea de forma rutinaria, no existen evidencias directas que demuestren que la fisioterapia respiratoria sea beneficiosa en estos pacientes[18-20]. Por lo tanto, el grado de recomendación actual de esta práctica es clase D, y sería interesante la realización de EAC con muestras grandes para elucidar definitivamente su papel en la bronquiolitis.

Rev Biomed 2002; 13.

Cuadro 3
Resumen de los grados de recomendación de los diferentes tratamientos teóricamente aplicables en un primer episodio de bronquiolitis aguda en un lactante previamente sano, basados en los niveles de evidencia actualmente existentes.

Hierbas chinas (Shuang Huang Lian)	D*
Interferón	E
Xantinas	E

* Intervenciones terapéuticas que podrían mejorar su nivel de recomendación si se acumularan nuevas evidencias con EAC de alta calidad.

Guía d tratamier

Fisioterapia.

A pesar de su uso rutinario, no existen evidencias directas que demuestren que la fisioterapia respiratoria sea beneficiosa en estos pacientes (7). Por lo tanto, el grado de recomendación actual de esta practica es clase D, y sería interesante la realización de EAC con muestras grandes para elucidar definitivamente su papel.

Eduardo A. L

Hospital de Gi

Bronchiolitis

Search date October 2006
Juan Manuel Lozano

QUESTIONS

What are the effects of prophylactic interventions for bronchiolitis in high-risk children? 3

METHODS

BMJ Clinical Evidence search October 2006. The following databases were used to identify studies for this review: Medline 1966 to October 2006, Embase 1980 to October 2006, and The Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Clinical Trials 2006, Issue 4. Additional searches were carried out using these websites: NHS Centre for Reviews and Dissemination (CRD) — for Database of Abstracts of Reviews of Effects (DARE) and Health Technology Assessment (HTA), Turning Research into Practice (TRIP), and National Institute for Health and Clinical Excellence (NICE). Abstracts of the studies retrieved from the initial search were assessed by an information specialist. Selected studies were then sent to the author for additional assessment, using pre-determined criteria to identify relevant studies. Study design criteria for inclusion in this review were: published systematic reviews and RCTs in any language containing

TREATMENT

Unknown effectiveness

Bronchodilators (inhaled salbutamol, inhaled adrenaline [epinephrine]) 4
Bronchodilators (oral) 8

Antibiotics
Continuous positive airway pressure
Fluid replacement
Oxygen

BMJ Clin Evid 2007;10:308

OPTION CHEST PHYSIOTHERAPY New

RCTs identified by a systematic review found no evidence that chest physiotherapy reduced severity scores or length of hospital stay compared with no physiotherapy.

Benefits: We found one systematic review (search date 2004, 3 RCTs, 172 children).[55] The included trials compared different types of chest physiotherapy (hand chest percussion, postural drainage, cough induction, vibration, nasopharyngeal aspiration) in hospitalised children with a clinical diagnosis of bronchiolitis who were not on mechanical ventilation. The review did not perform a meta-analysis; none of the RCTs found that chest physiotherapy significantly improved clinical scores or reduced length of hospital stay. The first RCT identified by the review (90 infants hospitalised with a clinical diagnosis of bronchiolitis) found no significant improvement in clinical scores with chest physiotherapy in those remaining in hospital to the fifth day (median score: 5 with chest physiotherapy *v* 6 without chest physiotherapy; reported as non significant, P value not reported). The clinical score was calculated by assigning a score of zero to three for each of 10 clinical signs (heart rate, respiratory rate, hyperinflation, use of accessory muscles, recession, rhinitis, wheeze, cough, crepitations, and rhonchi) to give a total severity clinical score of a maximum of 30 points. The RCT also found no significant difference in length of hospital stay (median length of stay 4 days with chest physiotherapy *v* 4 days without chest physiotherapy; reported as non significant, P value not reported). The second RCT identified by the review (50 infants, hospitalised with a clinical diagnosis of bronchiolitis) found no significant improvement in clinical score with chest physiotherapy during the five days of the trial (absolute results presented graphically; reported as not significant, P value not reported). The clinical score was calculated in the same way as the first included RCT. The RCT also found no significant difference between chest physiotherapy and no physiotherapy in length of hospital stay (mean 6.7 days with chest physiotherapy *v* 6.6 days without chest physiotherapy; reported as not significant, P value not reported). The third RCT identified by the review (32 infants, hospitalised with a clinical diagnosis of bronchiolitis) found no significant improvement in clinical score with chest physiotherapy on the fifth day of the study or at discharge if earlier (mean difference between the scores +0.13, 95% CI -0.71 to +0.97). The clinical score was constructed from five clinical variables: respiratory rate, heart rate, lung auscultation, and accessory muscle use. It is not clear how the final score was calculated. The RCT also found no significant reduction in length of stay (mean length of stay 4 days with chest physiotherapy *v* 3.9 days without chest physiotherapy; mean difference 0.13 days, 95% CI -1.00 to +1.26)

Harms: None of the RCTs included in the review reported adverse effects.[55]

Comment: The authors in the review concluded that chest physiotherapy cannot be recommended for hospitalised children with bronchiolitis. Pooling the data could have reduced the chance of a type II error (false negative). However, such error is unlikely for length of hospital stay, since two of the RCTs had a large enough sample size to find a difference of 1 day between treatments.[55]

Fisioterapia respiratoria para la bronquiolitis aguda en pacientes pediátricos de hasta 24 meses de vida Perrotta C, Ortiz Z, Roque M

Esta revisión consideró la efectividad de la fisioterapia respiratoria en la bronquiolitis aguda. La fisioterapia respiratoria no disminuye la duración de la estancia hospitalaria en los niños con bronquiolitis aguda. No hay pruebas adecuadas a favor o en contra de la mejoría de las puntuaciones clínicas. Se necesita investigación adicional para evaluar la eficacia de la fisioterapia torácica en esta enfermedad.

La Biblioteca Cochrane Plus (ISSN 1745-9990), número 2, 2007. Oxford,
Fecha de la modificación significativa más reciente: 11 de octubre de 2006
Fecha de la traducción: 26 de febrero de 2007

Criterios de selección

Ensayos controlados aleatorios (ECA) en los que se comparó la fisioterapia respiratoria con otro tipo de fisioterapia o con ninguna intervención, en pacientes pediátricos menores de 24 meses de vida.

Recopilación y análisis de datos

Dos autores de la revisión extrajeron los datos de forma independiente. La medida de resultado primaria fue una puntuación clínica de la gravedad. Los resultados secundarios fueron la duración de la estancia hospitalaria, la duración de la administración de suplementos de oxígeno y el uso de broncodilatadores y esteroides.

Conclusiones de los revisores

Según los resultados de tres ECA, la fisioterapia respiratoria con técnicas de vibración y percusión no disminuye la duración de la estancia hospitalaria y la necesidad de oxígeno, ni mejora la puntuación clínica de la gravedad en los niños con bronquiolitis aguda. Estos estudios comprendieron niños que no requerían asistencia respiratoria mecánica y no presentaban otra comorbilidad. La fisioterapia respiratoria con técnicas de espiración forzada necesita ser evaluada en la investigación clínica.

Airway Clearance Applications in Infants and Children

Michael S Schechter MD MPH

A Cochrane review of 3 clinical trials of routine CPT for infants hospitalized with bronchiolitis found no significant advantage regarding duration of hospital stay, duration of illness, or daily clinical score.[46] Rib fractures have been reported in young infants who received CPT as treatment for bronchiolitis.[19]

The rationale for airway clearance therapy and basic principles of its application are identical for children and adults, but there are important differences in physiology (regarding airway mucus characteristics and airway mechanics) and pathological processes in children, as well as other considerations unique to the pediatric population. The major obstacle in reviewing the evidence for efficacy of airway clearance therapy in pediatrics is the lack of data from well-performed, adequately powered clinical trials. This problem is partially alleviated by the use of published meta-analyses. A review of pediatric studies suggests that airway clearance therapy is of clear and proven benefit in the routine care of cystic fibrosis, and that no specific airway-clearance technique is clearly superior, but for any individual patient the technique that is most likely to maximize patient adherence to treatment is preferred. Airway clearance therapy appears likely to be of benefit in the routine care of children with neuromuscular disease and cerebral palsy, and is probably of benefit in treating atelectasis in children on mechanical ventilation. Airway clearance therapy may be of benefit in preventing post-extubation atelectasis in neonates. Airway clearance therapy appears to be of minimal to no benefit in the treatment of children with acute asthma, bronchiolitis, hyaline

Evidence quality	Preponderance of benefit or harm	Balance of benefit and harm
A. Well-designed RCTs or diagnostic studies on relevant populations	Strong recommendation	Option
B. RCTs or diagnostic studies with minor limitations; overwhelmingly consistent evidence from observational studies	Recommendation	
C. Observational studies (case-control and cohort design)		
D. Expert opinion, case reports, reasoning from first principles	Option	No recommendation
X. Exceptional situations in which validating studies cannot be performed and there is a clear preponderance of benefit or harm	Strong recommendation / Recommendation	

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Management of Bronchiolitis
osis and Management of Bronchiolitis
2006;118;1774-1793
.1542/peds.2006-2223

along with updated information and services, is
the World Wide Web at:
cs.org/cgi/content/full/118/4/1774

RECOMMENDATION 6b

Chest physiotherapy should not be used routinely in the management of bronchiolitis (recommendation: evidence level B; RCTs with limitations; preponderance of harm over benefit).

The level of respiratory distress caused by bronchiolitis guides the indications for use of other treatments.

American Academy of Pediatrics
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Abstract

Background: Acute bronchiolitis treatment in children and infants is largely supportive, but chest physiotherapy is routinely performed in some countries. In France, national guidelines recommend a specific type of physiotherapy combining the increased exhalation technique (IET) and assisted cough (AC). Our objective was to evaluate the efficacy of chest physiotherapy (IET + AC) in previously healthy infants hospitalized for a first episode of acute bronchiolitis.

Methods and Findings: We conducted a multicenter, randomized, outcome assessor-blind and parent-blind trial in seven French pediatric departments. We recruited 496 infants hospitalized for first-episode acute bronchiolitis between October 2004 and January 2008. Patients were randomly allocated to receive from physiotherapists three times a day, either IET + AC (intervention group, $n = 246$) or nasal suction (NS, control group, $n = 250$). Only physiotherapists were aware of the allocation group of the infant. The primary outcome was time to recovery, defined as 8 hours without oxygen supplementation associated with minimal or no chest recession, and ingesting more than two-thirds of daily food requirements. Secondary outcomes were intensive care unit admissions, artificial ventilation, antibiotic treatment, description of side effects during procedures, and parental perception of comfort. Statistical analysis was performed on an intent-to-treat basis. Median time to recovery was 2.31 days, (95% confidence interval [CI] 1.97–2.73) for the control group and 2.02 days (95% CI 1.96–2.34) for the intervention group, indicating no significant effect of physiotherapy (hazard ratio [HR] = 1.09, 95% CI 0.91–1.31, $p = 0.33$). No treatment by age interaction was found ($p = 0.97$). Frequency of vomiting and transient respiratory destabilization was higher in the IET + AC group during the procedure (relative risk [RR] = 10.2, 95% CI 1.3–78.8, $p = 0.005$ and RR = 5.4, 95% CI 1.6–18.4, $p = 0.002$, respectively). No difference between groups in bradycardia with or without desaturation (RR = 1.0, 95% CI 0.2–5.0, $p = 1.00$ and RR = 3.6, 95% CI 0.7–16.9, $p = 0.10$, respectively) was found during the procedure. Parents reported that the procedure was more arduous in the group treated with IET (mean difference = 0.88, 95% CI 0.33–1.44, $p = 0.002$), whereas there was no difference regarding the assessment of the child's comfort between both groups (mean difference = −0.07, 95% CI −0.53 to 0.38, $p = 0.40$). No evidence of differences between groups in intensive care admission (RR = 0.7, 95% CI 0.3–1.8, $p = 0.62$), ventilatory support (RR = 2.5, 95% CI 0.5–13.0, $p = 0.29$), and antibiotic treatment (RR = 1.0, 95% CI 0.7–1.3, $p = 1.00$) was observed.

Conclusions: IET + AC had no significant effect on time to recovery in this group of hospitalized infants with bronchiolitis. Additional studies are required to explore the effect of chest physiotherapy on ambulatory populations and for infants without a history of atopy.

Trial registration: ClinicalTrials.gov NCT00125450

Evaluation of an Alternative Chest Physiotherapy Method in Infants With Respiratory Syncytial Virus Bronchiolitis

Guy Postiaux PT, Jacques Louis MD, Henri C Labasse MD, Julien Gerroldt PT, Anne-Claire Kotik PT, Amandine Lemuhot PT, and Caroline Patte PT

BACKGROUND: We proposed a new chest physiotherapy (CPT) secretion clearance method to treat respiratory syncytial virus bronchiolitis in infants. Our new CPT method consists of 15 prolonged slow expirations, then 5 provoked cough maneuvers. METHODS: We randomized 20 infants (mean age 4.2 months) into 2 groups: 8 patients received 27 sessions of nebulization of hypertonic saline; 12 patients received 31 sessions of nebulization of hypertonic saline followed by our new CPT method. We used the Wang clinical severity scoring system (which assesses wheezing, respiratory rate, retractions, and general condition) and measured S_{pO_2} and heart rate before each CPT session (T0), immediately after the 30-min session (T30), and 120 min after the session (T150). RESULTS: Within the groups: in the first group, Wang score was significantly lower at T150 than at T0: 4.6 vs 5.0 ($P = .008$). In the new-method-CPT group, Wang score was significantly lower at T30 (3.6 vs 4.3, $P = .001$) and at T150 (3.7 vs 4.3, $P = .002$). Wheezing score was significantly lower at T150 than at T0 (1.1 vs 1.2, $P = .02$) in the first group, and in the new-method-CPT group at T30 than at T0 (0.8 vs 1.3, $P = .001$) and at T150 than at T0 (0.9 vs 1.3, $P = .001$). Between the groups: at T30 the improvement was significantly better in the new-method-CPT group for overall Wang score ($P = .02$), retractions ($P = .05$), respiratory rate ($P = .001$), and heart rate ($P < .001$). At T150 the Wang score was not significantly different between the groups. At T30 (versus T0) the difference in percent gain between the groups was significant for Wang score ($P = .004$), wheezing ($P = .001$), and heart rate ($P = .02$). Over 5-hospital days, the daily baseline (T0) Wang score decreased significantly in the new-method-CPT group ($P = .002$), whereas it did not in the first group. There were no adverse events. Average hospital stay was not significantly different between the groups. CONCLUSIONS: Our new CPT method showed short-term benefits to some respiratory symptoms of bronchial obstruction in infants with acute respiratory syncytial virus bronchiolitis. *Key words: bronchial obstruction; chest physiotherapy; infant; prolonged slow expiration technique; viral bronchiolitis; respiratory syncytial virus; airway clearance.* [Respir Care 2011;56(7):989–994. © 2011 Daedalus Enterprises]

Introduction

Infant viral bronchiolitis is an obstructive lower respiratory tract infection that is responsible for substantial morbidity in children under age 2. Bronchiolitis is characterized by acute inflammation, edema, increased mucus production, and bronchospasm, which affect the flow and the permeability of the small airways, causing hyperinfla-

Mr Postiaux, Dr Louis, Mr Gerroldt, Ms Kotik, Ms Lemuhot, and Ms Patte are affiliated with the Department of Pediatrics; and Dr Labasse is affiliated with the Department of Neurosciences, Grand Hôpital de Charleroi, Montignies-sur-Sambre, Belgium.

Mr Postiaux presented a version of this paper at the Annual Congress of the European Respiratory Society, held October 3-7, 2008, in Berlin, Germany.

The authors have disclosed no conflicts of interest.

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DOI: 10.4187/respcare.00721

CHEST PHYSIOTHERAPY FOR ACUTE BRONCHIOLITIS IN PAEDIATRIC PATIENTS BETWEEN 0 AND 24 MONTHS OLD

Roqué i Figuls Marta, Giné-Garriga Maria, Granados Rugeles Claudia, Perrotta Carla

Roqué i Figuls Marta, Giné-Garriga Maria, Granados Rugeles Claudia, Perrotta Carla

Cochrane Database of Systematic Reviews, Issue 07, 2012 (Status in this issue: NEW SEARCH FOR STUDIES AND CONTENT UPDATED (CONCLUSIONS CHANGED))

This is an update of the original Cochrane review published in 2005 and updated in 2007. Acute bronchiolitis is the leading cause of medical emergencies during winter in children younger than two years of age. Chest physiotherapy is thought to assist infants in the clearance of secretions and to decrease ventilatory effort.

The main objective was to determine the efficacy of chest physiotherapy in infants aged less than 24 months old with acute bronchiolitis. A secondary objective was to determine the efficacy of different techniques of chest physiotherapy (for example, vibration and percussion and passive forced exhalation).

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2011, Issue 4) which contains the Cochrane Acute Respiratory Infections Group's Specialised Register, MEDLINE (1966 to November week 3, 2011), MEDLINE in-process and other non-indexed citations (8 December 2011), EMBASE.com (1990 to December 2011), CINAHL (1982 to December 2011), LILACS (1985 to December 2011) and Web of Science (1985 to December 2011).

Selection criteria

Randomised controlled trials (RCTs) in which chest physiotherapy was compared against no intervention or against another type of physiotherapy in bronchiolitis patients younger than 24 months of age.

Data collection and analysis

Two review authors independently extracted data. Primary outcomes were respiratory parameters and improvement in severity of disease. Secondary outcomes were length of hospital stay, duration of oxygen supplementation and the use of bronchodilators and steroids. No pooling of data was possible.

Main results

Nine clinical trials including 891 participants were included comparing physiotherapy with no intervention. Five trials (246 participants) evaluated vibration and percussion techniques and four trials (645 participants) evaluated passive expiratory techniques. We observed no significant differences in the severity of disease (eight trials, 867 participants). Results were negative for both types of physiotherapy. We observed no differences between groups in respiratory parameters (two trials, 118 participants), oxygen requirements (one trial, 50 participants), length of stay (five trials, 222 participants) or severe side effects (two trials, 595 participants). Differences in mild transient adverse effects (vomiting and respiratory instability) have been observed (one trial, 496 participants).

Authors' conclusions

Since the last publication of this review new good-quality evidence has appeared, strengthening the conclusions of the review. Chest physiotherapy does not improve the severity of the disease, respiratory parameters, or reduce length of hospital stay or oxygen requirements in hospitalised infants with acute bronchiolitis not on mechanical ventilation. Chest physiotherapy modalities (vibration and percussion or forced expiratory techniques) have shown equally negative results.

New search has been performed

Searches conducted. Six new trials were included in this update (Aviram 1992 ; De Córdoba 2008 ; Gajdos 2010 ; Lopez Galbany 2004 ; Postiaux 2011 ; Rochat 2010) and one trial was excluded (Pupin 2009).

13 December 2011

New citation required and conclusions have changed

New evidence shows no benefit of forced expiratory techniques. A new review author joined the original author team to update this review.

We have included nine studies in this review (Aviram 1992 ; Bohe 2004 ; De Córdoba 2008 ; Gajdos 2010 ; Lopez Galbany 2004 ; Nicholas 1999 ; Postiaux 2011 ; Rochat 2010 ; Webb 1985), totaling 891 participants. Two of the trials are unpublished (Aviram 1992 ; Lopez Galbany 2004). Five trials assessed percussion and vibration techniques in 246 participants (Aviram 1992 ; Bohe 2004 ; De Córdoba 2008 ; Nicholas 1999 ; Webb 1985) while four trials assessed forced expiratory techniques in 645 participants (Gajdos 2010 ; Lopez Galbany 2004 ; Postiaux 2011 ; Rochat 2010).

All nine trials evaluated the efficacy of chest physiotherapy in hospitalised infants with a clinical diagnosis of acute bronchiolitis. Gajdos 2010 included infants with severe bronchiolitis and Nicholas 1999 included infants who required nasogastric feeding or intravenous fluid. Two studies were carried out in the UK (Nicholas 1999 ; Webb 1985), two in France (Postiaux 2011 ; Gajdos 2010) and one in Israel (Aviram 1992), Spain (Lopez Galbany 2004), Argentina (Bohe 2004), Switzerland (Rochat 2010) and Brazil (De Córdoba 2008).

The most recent trial was conducted in France (Postiaux 2011) and recruited 20 infants with acute RSV bronchiolitis, with a mean age of 4.19 months. Infants were randomised to inhalation of a 3% hypertonic saline solution and salbutamol (n = eight) or to a physiotherapy protocol combining prolonged slow expiration technique and coughing provoked after the same inhalation of saline solution and salbutamol (n = 12). The two groups were similar with regards to age, sex and Wang clinical severity score (Wang 1992) on admission. The trial main outcome is Wang's clinical score, which assigns a value between zero and three to each of the four variables: respiratory rate, wheezing, retractions and general condition. The maximum Wang score is 12 and a higher Wang score indicates worse condition. Secondary outcomes were SpO2 and heart rate (HR). All outcomes were assessed before the session, at the end of the session and two hours afterwards. Both of the paediatrician evaluators were blinded to the applied treatment and goals. Physiotherapists in charge of administering the treatments were instructed to ignore the results of each evaluation until the end of the study. The participants' parents were unaware of the group in which their child was included. In both groups the periods of time spent in the room were identical, so outside observers were blinded to the applied treatment.

The largest trial was also conducted in France (Gajdos 2010), randomising 496 hospitalised infants with a first acute bronchiolitis episode between the ages of 15 days and 24 months (mean age two months, range 1.3 to 3.9 months). Infants had to present at least one of the following on admission: toxic aspect; history of apnoea or cyanosis; respiratory rate > 60/min, pulse oxymetry < 95%, alimentary intake < 2/3 of needs. The control group presented a higher proportion of RSV-positive patients than the intervention group (76.4% versus 73.3%), as well as the proportion of cases of lung atelectasia diagnosis on X-ray (12.9% versus 7.6%). Patients were allocated to receive either increased exhalation technique with assisted cough (n = 246) or nasal suction (n = 250). All interventions were administered three times a day, with the physiotherapist staying alone with the infant in a room with a covered window pane. The primary outcome was time to recovery, defined as eight hours without oxygen supplementation associated with minimal or no chest recession and ingesting more than two-thirds of daily food requirements. Survival analyses of time to recovery were adjusted for prognostic baseline covariates (personal eczema or history of atopy, age in months, hypoxaemia at randomisation, need for intravenous (IV) fluids at randomisation, atelectasia at randomisation, duration of symptoms, use of mucolytic before randomisation or RSV infection). The therapists were not involved in the evaluation of time to recovery. Secondary outcomes were intensive care unit admissions, artificial ventilation, antibiotic treatment, description of side effects during procedures and parental perception of comfort.

Rochat 2010 analysed 99 infants admitted to a Swiss hospital with bronchiolitis during two consecutive respiratory syncytial virus (RSV) seasons (2005 to 2006 and 2006 to 2007). Participants had a mean age of 3.9 months. All infants received standard care including oxygen therapy and rhinopharyngeal suctioning. Infants were either randomised to additionally receive physiotherapy protocol combining prolonged slow expiratory technique, slow accelerated expiratory technique and coughing provoked (n = 51), or randomised to no physiotherapy (n = 53). The two groups were similar with regard to age, sex, clinical and respiratory severity score on admission, proportion who were RSV ELISA positive (overall proportion 75%) and history of eczema (overall proportion 7%). The trial assessed time to clinical stability, clinical and respiratory scores, respiratory rate, pulse oximetry oxygen saturation (SpO2) and complications such as transfer to the intensive care unit.

De Córdoba 2008 randomised 24 hospitalised infants below two years of age, in Brazil. Nineteen of those infants were analysed, of whom five were allocated to vibration and postural drainage, eight to percussion and postural drainage and six to the control group (bronchial aspiration). Infants had to present clinical and laboratory signs of acute viral bronchiolitis and bronchial hypersecretion (pulmonary auscultation). There was no information on percentage of RSV patients or patients with collapse/consolidation at baseline or during the trial. The three groups were similar with regard to age, sex, oxygen saturation and cardiac and respiratory frequency on admission. Mean age was 93 days, 131 days and 125 days in each intervention group. The main outcomes were: saturation of oxygen pulse, cardiac frequency, respiratory frequency, Silverman-Anderson Score of respiratory discomfort and amount of inhaled secretions. Outcomes were assessed immediately after treatment and 15 minutes later. Results were expressed as means and standard deviations (SDs).

AUTHORS' CONCLUSIONS

Based on nine trials, chest physiotherapy either using percussion and vibration techniques or forced expiratory techniques has not shown to improve the course of the illness in hospitalised infants with acute bronchiolitis, and it does not reduce time until recovery or length of stay. Therefore, it should not be recommended standard practice. Clinicians should take into account the lack of evidence supporting any clinical benefit of chest physiotherapy, as well as its possible adverse effects (both mild frequent effects like vomiting and respiratory imbalance and other severe rare effects) and its costs.

Even though chest physiotherapy is unlikely to change the course of the disease, in at least one trial it has provided transient relief. Clinicians could consider its use in specific clinical circumstances during the illness to aid with clearing of secretions.

Quality of the evidence

The quality of the evidence in this review is moderate, stemming from a small number of trials with moderate risk of bias but consistent across trials and consistent with a large trial of low risk of bias. This allows us to draw robust conclusions.

+Model
ANPEDI-950; No. of Pages 7

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ELSEVIER DOYMA

ANALES DE PEDIATRÍA

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ORIGINAL

Estudio de la eficacia y utilidad de la fisioterapia respiratoria en la bronquiolitis aguda del lactante hospitalizado. Ensayo clínico aleatorizado y doble ciego

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Resumen

Objetivo: Estudiar la utilidad de una modalidad específica de fisioterapia respiratoria, consistente en maniobras de espiración lenta prolongada seguida de tos provocada, en el tratamiento de la bronquiolitis aguda (BA) del lactante hospitalizado.

Pacientes y métodos: Ensayo clínico aleatorizado y doble ciego realizado con 236 pacientes de edad inferior a 7 meses e ingresados con diagnóstico de bronquiolitis aguda, primer episodio, en la sección de lactantes de un hospital pediátrico de Madrid. Los pacientes fueron distribuidos aleatoriamente en el momento del ingreso en dos grupos: los que recibieron maniobras de fisioterapia respiratoria y los que recibieron otras maniobras placebo. Únicamente los fisioterapeutas que intervinieron en el estudio conocían la asignación de los niños. Los días de hospitalización y las horas de oxigenoterapia fueron utilizados como medida de resultado.

Resultados: De la totalidad de los niños estudiados, el 57,6% recibió maniobras de fisioterapia respiratoria
la estancia
y el tiempo
4,54 días (I
en el grupo
estadística.
nasofaringe
terapia 48,
respectivan

La edad en nuestro estudio no ha influido en los resultados obtenidos, siendo la edad un motivo de consideración especial en algunas de las publicaciones existentes[24–26] y concluyendo que en los lactantes más pequeños se hacen más intervenciones terapéuticas, aplicación de maniobras de fisioterapia respiratoria incluidas. Parece ser que la eficacia de la fisioterapia respiratoria podría disminuir en los lactantes más pequeños, ya que resulta difícil llegar a movilizar las secreciones en las vías de mínimo calibre de los niños más pequeños; no se sabe bien qué cambios acontecen a nivel pulmonar después de aplicar las maniobras de fisioterapia y eso dificulta llegar a conclusiones que expliquen la relación entre edad y eficacia de la fisioterapia.

2

BRONQUIOLITIS

- Infección respiratoria aguda baja en el niño, que causa inflamación y obstrucción de la pequeña vía aérea

ANATOMÍA PATOLÓGICA

- Se produce necrosis del epitelio bronquiolar, con desaparición de los cilios; aparece infiltrado peribronquiolar de linfocitos, células plasmáticas y macrófagos. Hay edema adventicial y submucoso e hipersecreción de moco, pero no se afectan ni el tejido elástico ni el muscular; todo ello origina obstrucción de pequeños bronquiolos con colapso o enfisema distal. Las lesiones suelen ser parcheadas.

Fisiopatología

- Invasión de las ramificaciones mas pequeñas de los bronquios por los virus
- Obstrucción bronquiolar causada por el edema ,la acumulación de moco y residuos celulares. Atrapamiento aéreo e hiperinsuflación
- Posibilidad de ATLs
- Desequilibrio V/Q - HIPOXEMIA
- Hipercapnia c/ FR mayor a 60

KTR

Objetivos

Principal: evacuar o reducir la obstrucción bronquial, removiendo el **exceso** de moco en las vías aéreas.

Secundario: prevención o tratamiento de las atelectasias y la hiperinsuflación pulmonar.

Terciario: prevención de los daños estructurales (remodelación)

Técnicas

- Percusión
- Vibración
- Drenajes Posturales
- Movilización
- Hiperventilación Manual (MEP)
- Aspiración

TODOS SABEMOS PARA QUE SIRVEN.....
Pueden o deben ser realizadas de rutina.....?
Hay evidencia científica que lo demuestre.....?

KTR - Percusión

Ondas de Choque

- Manual aprox. 1 y 7 Hz
- Oscilación despegue 25 Hz
- Asociada a Broncoespasmo y desaturación

Pediatr Radiol (2002) 32: 644–647
DOI 10.1007/s00247-002-0755-y

ORIGINAL ARTICLE

Martin Chalumeau
Laurence Foix-l'Helias
Pierre Scheinmann
Pierre Zuani
Dominique Gendrel
Hubert Ducou-le-Pointe

Rib fractures after chest physiotherapy for bronchiolitis or pneumonia in infants

Abstract *Background*: The reported causes of rib fractures in infants are: child abuse, accidental injury, cardiopulmonary resuscitation, bone fragility, birth trauma and severe cough. *Objective*: To report chest physiotherapy (CPT) as a new cause of rib fractures in five infants. *Materials and methods*: We retrospectively identified all infants with rib fractures after CPT for bronchiolitis or pneumonia over a 4-year period in two paediatric and one paediatric radiology units in three university hospitals in Paris. *Results*: Five boys were identified. Their median age was 3 months. None had any other potential cause of rib fractures. The indication for CPT was bronchiolitis in four cases and pneumonia in one. The median number of rib fractures was four (range 1–5). Fractures were located between the 3rd and 8th ribs; they were lateral in four patients and posterior in one; they were unilateral in four patients and bilateral in one. Evolution was favourable in all cases. The prevalence of rib fractures after CPT during the study period was estimated at 1 in 1,000 infants hospitalised for bronchiolitis or pneumonia. *Conclusions*: CPT should be considered a potential, but very rare cause of rib fractures in infants. It can be of clinical relevance when rib fractures are the only feature suggestive of child abuse.

Keywords Rib fractures · Aetiology · Radiography · Bronchiolitis · Pneumonia · Physical therapy

KTR - Vibraciones

Modificación VISCO-ELASTICIDAD de la secreción,

TIXOTROPIA. Oscilación aprox. 60Hz

- Manual aprox. 4 - 25 Hz, (no puede ser sostenida más de 5 seg.

- Mecánica 1 - 100 Hz (fluidificación)

KTR – Drenaje Postural

Técnica gravitacional

Se necesitan flujos mayores para transportar secreciones en posiciones verticales que con posiciones horizontales (Kim C. et al. J Appl Physiol 1987; 62: 959-971)

- Posiciones deducidas orientación teórica
- Variaciones morfológicas
- Variaciones angulares durante la ventilación
- La masa de secreciones es < fuerzas adhesión de las secreciones

(Wong, WP et al. J Appl Physiol. 2003)

KTR – Drenaje Postural

- En pediatría, los pacientes con patología unilateral, se ven favorecidos al colocarlos en decúbito lateral, con el pulmón afectado en posición independiente.

Postural effects on gas exchange in infants
Heaf et al, The New Engl J of Med 1983;308, 1505-1508,

Regional ventilation in infancy: Reversal of adult pattern
Davies, The New Engl J Med 1985; 313: 1626-1628

Effects of posture on the distribution of pulmonary ventilation and perfusion in children and adults. Bhuyan 1989,Thorax: 44: 480-484

Effect of posture on regional ventilation in children
Davies, Pediatric Pulmon 1992; 12: 227-232

Movilización – Aceleración del Flujo Espiratorio

- Premisas
  - Secreciones son desplazadas por:
    - » CILIOS
    - » FLUJO AEREO ESPIRATORIO
  - El Kinesiólogo puede manualmente:
    - » AUMENTAR y / o DISMINUIR los FLUJOS AEREOS ESP/INS

(Kim C. et al. J Appl Physiol 1987; 62: 959-971)

Técnicas de espiración forzada

- Es muy efectiva en la vía aérea media
- Requiere de un balance entre, la P transmural que produce la compresión torácica y estabilidad bronquial, para producir una efectividad óptima.
- La posición del punto de estrangulamiento es volumen pulmonar dependiente

Physiotherapy for airway clearance in paediatrics. B. Oberwaldner. Eur Respir J 2000; 15: 196–204.

TEF en neonatos e infantes…

Bronchial stability is lacking in the premature baby, newborn and infant, leading to this age group presenting with the specific problem of an excessively compressible tracheobronchial tree. Increased compliance of the airways in the newborn and young infant has been documented in several *ex vivo* and *in vivo* studies [7–9]. Tracheal cartilage in preterm animals is extremely compliant and only gains in stiffness with age [10]. In addition to well developed and stable tracheobronchial cartilage, bronchial stability requires a certain mass and tone of bronchial smooth muscle [11, 12]. In agreement with the observation of increased bronchial compliance, bronchial smooth muscle mass is reduced in newborns [13]. The healthy infant gradually acquires bronchial wall stability sufficient for effective coughing and forced expirations during the first year of life.

Physiotherapy for airway clearance in paediatrics. B. Oberwaldner. Eur Respir J 2000; 15: 196–204.

Por lo tanto…

- Deben ser abolidas las altas presiones transtorácicas aplicadas externamente, para prevenir la interrupción del flujo de aire.
- Deben ser lo suficientemente altas para permitir el desplazamiento del moco, pero lo bastante bajas como para permitir flujo de aire.
- Lo que requiere mucha experiencia en el manejo manual de la técnica, sobretodo en neonatos e infantes.

Physiotherapy for airway clearance in paediatrics. B. Oberwaldner. Eur Respir J 2000; 15: 196–204.

Effect of transmural pressure on preloads and collapse of immature bronchi

P.K. McFawn, H.W. Mitchell

Eur Respir J 1997; 10: 322–329.

Bronchi from immature animals and human infants are vulnerable to collapse by small changes in transmural pressure. Bronchial closure is partly dependent on smooth muscle tone, particularly in younger animals.

Airway closure in children. Mansell, J Appl Physiol 33: 711-714, 1972

- Los niños poseen un alto volumen de cierre.
- La inestabilidad de la vía aérea pequeña con cierre a volumen corriente es característica del pulmón inmaduro.
- El aumento del volumen de cierre conlleva una disminución de la CRF.
- Este fenómeno sumado a la resistencia aumentada de la vía aérea periférica y la baja tensión de O2 explicaría la susceptibilidad a las enfermedades de la vía aérea pequeña.

Proceedings of the 29th Annual International
Conference of the IEEE EMBS
Cité Internationale, Lyon, France
August 23-26, 2007.

SaP2C5.4

Measurement System for Gesture Characterization During Chest Physiotherapy Act on Newborn Babies Suffering from Bronchiolitis

L. Maréchal, C. Barthod, J. Lottin, G. Gautier and J. C. Jeulin

***Abstract*—Despite the lack of studies, chest physiotherapy (CPT) is widely used for newborn babies suffering from bronchiolitis. The limited data regarding this technique is mainly due to the difficulties making in situ measurements during the act. In the presented study, original instrumented gloves were designed and realized to perform measurements on babies during the CPT act. Custom-designed associated electronics and software were specially developed to monitor and record the forces applied by the physiotherapist's hands on the infant's chest and their trajectories. A prospective study, with babies in real situation, validates the principle measurement. Measurements with the system was led on babies in a referent physiotherapist consulting room between January and March 2007. The results are being analyzed and typical phases of the CPT act are highlighted.**

Muchas Gracias!