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Chest physical therapy in infant acute viral bronchiolitis: Should we really surrender?

La kinésithérapie dans la bronchiolite du nourrisson : faut-il vraiment abandonner ?

G. Postiaux^{a,*}, R. Hankard^b, J.-P. Saulnier^c, S. Karolewicz^b, J. Benielli^d, T. Le Dinahet^d, J. Louis^a

^a *Groupe d'étude pluridisciplinaire stéthacoustique, services de pédiatrie et des soins intensifs, grand hôpital de Charleroi, grand rue 3, 6000 Charleroi, Belgium*

^b *Inserm U 1069, université F.-Rabelais, CHU de Tours, 37000 Tours, France*

^c *Unité de réanimation pédiatrique, CHU La Milétrie, 2, rue de la Milétrie, 86021 Poitiers cedex, France*

^d *Institut de formation en masso-kinésithérapie, CHU de Poitiers, 2, rue de la Milétrie, BP 577, 86021 Poitiers cedex, France*

The efficacy of chest physical therapy infant acute viral bronchiolitis has been debated for many years. In September 2000 in France, the French National Health Evaluation and Accreditation Agency (l'Agence nationale d'accréditation et d'évaluation en santé, ANAES), which has since become the French National Authority for Health (Haute Autorité de santé, HAS), detailed the role of chest physical therapy for bronchial obstruction, using specific prolonged slow expiration (PSE) and provoked cough techniques [1]. Given the lack of scientific arguments, the consensus conference released an expert opinion on the subject. It mentioned the absence of chest physical therapy in the Anglo-Saxon countries, Switzerland, Spain, etc. In France and Belgium, chest physical therapy is often prescribed, however. The arguments underlying this prescription are the quality of nasal clearance obtained and the possibility for regular monitoring of the infant's clinical status by a healthcare professional. More recently, a Cochrane review concluded that chest physical therapy had no effect on hospitalization length of stay, oximetry, and the severity scores, and did not recommend chest physical therapy for this condition. Since then, recent, apparently contradictory publications (i.e., reports from Gajdos et al. [2] and our group [3]) have added to the November 2012 update of the Cochrane review [4]. These publications, however, have not motivated the Cochrane review to revise its conclusions, which even indicated that

these conclusions had been reinforced by data from new studies. However, the Cochrane review can be interpreted at several levels.

The first level consists in reporting literally and unconditionally the conclusions of the Cochrane group, as was done by the general or mainstream press. Although for scientists, these press articles have no more than an anecdotal value, in the minds of families they cast doubt on the physicians and physical therapists caring for their children. It should be remembered that the Cochrane review analyzes the methodological conformity of publications (randomized controlled clinical trials). In this case, it is not a meta-analysis.

The second reading consists in analyzing the protocol of each study reported: which technical intervention was implemented? Which population was studied? What was the physiopathological reasoning behind the intervention? Which outcomes were expected, particularly in terms of the bronchial obstruction, over the short and middle terms? Which contraindications of the physical therapy may have resulted in the procedure's failure? Of the nine studies retained by the Cochrane review, five involved percussions and vibrations (conventional chest physical therapy [cCPT], which prevails in Anglo-Saxon countries) and four passive exhalation maneuvers (used in France and Belgium). At this stage, confusion arises from the induced exhalation maneuvers (increased exhalation technique [IET] – *augmentation/accélération du*

* Corresponding author.

e-mail: guy.postiaux@gmail.com (G. Postiaux).

flux expiratoire [AFE]) and the slow exhalation maneuver (the prolonged slow expiration technique [PSE] – *expiration lente prolongée* [ELPr]) grouped under the single term “passive exhalation maneuvers” (*manœuvres expiratoires passives*), whereas their modality differs fundamentally. Actually, of these four studies, three investigated IET/AFE [2] and one PSE/ELPr [3]. This confusion does not clarify matters for the reader and generates a truncated analysis. After a recent assessment [5], it is clear that the first two methods – cCPT and IET/AFE – extrapolated from studies on adults, should be ruled out because they are responsible for detrimental side effects and repeated treatment failure when implemented. These techniques are unsuitable for the infant’s respiratory system whose mechanical characteristics are specific: ribcage instability and highly compliant trachea and airways. PSE is safe and more attuned to the infant’s mechanical respiratory system [6].

The populations studied differed from one study to another in that the prescription was based on the diagnosis of infant acute viral bronchiolitis, which did not take into account the degree of severity. The indication or the contraindication of chest physical therapy should be symptom-based upon assessment of clinical criteria, grading the bronchial obstruction using a score. The diagnostic label takes a secondary place. In a recent review article, a decision tree was proposed that summarized these requirements [5]. The grading of bronchial obstruction is established therein using the Wang clinical severity score prevailing in the literature [7]:

- in severe bronchiolitis, the patient is hospitalized and any physical maneuver that may worsen the child’s condition is contraindicated;
- moderate bronchiolitis may be the best indication in hospital and ambulatory settings for PSE-type physical therapy;
- mild bronchiolitis is self-limiting and does not require specific treatment other than monitoring the child’s clinical condition, nasal permeability, and a reminder of the usual hygiene rules.

Finally, the therapeutic procedure should take into account the pathophysiology of bronchial obstruction, which associates edema, bronchospasm, and hypersecretion. This multifactorial feature of bronchial obstruction entails a chronological differential response. It is ineffective to attempt to eliminate bronchial secretions if the bronchial wall edema has not been reduced or resolved. Nebulization of a hypertonic saline solution whose effects have been established, modifies the ionic imbalance of the epithelium and pursues this objective: it should precede any physical maneuvers. The protocol combining nebulization of 3% hypertonic saline preceding physical therapy should be an alternative [8].

To sum up, the Cochrane Collaboration analysis can be criticized on several points: it confuses techniques, it does not distinguish the different severity levels of the disease in the populations studied, and it does not take into account the multifactorial pathophysiology of bronchial obstruction.

Therefore, given today’s knowledge, chest physical therapy in moderate infant acute viral bronchiolitis can play a role provided that current practices evolve and obsolete, at-risk, as well as damaging or non-validated methods are eradicated. The indications for chest physical therapy should be better established depending on the degree of severity of the bronchial obstruction and the methods based on validated clinical criteria should be the basis for this decision. Currently, only preliminary results allow us to think that PSE will have a place in the future treatment of infant acute viral bronchiolitis. A multicenter study that could also take into account the medical and economic impacts is required.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

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