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Title: Hypertonic saline and acute wheezing in pre-school children

Dr. Dorit 14171 Ater dater@netvision.net.il MD ^{1,5}, Dr. Hanita 14172 Shai hanitashai@gmail.com MD ², Dr. Bat-El 14173 Bar batelbar@yahoo.com MD ², Dr. Nir 14174 Fireman nfireman@hotmail.com MD ², Dr. Daiana 14175 Tasher dtasher@gmail.com MD ³, Prof. Ilan 14185 Dalal ilandalal@hotmail.com MD ⁴, Prof. Ami 14195 Ballin ballin@wolfson.health.gov.il MD ² and Dr. Avigdor 14196 Mandelberg avigdorm@netvision.net.il MD ¹. ¹ Pediatric Pulmonary Unit, Wolfson Medical Centre, Sackler School of Medicine, Tel Aviv University, Holon, Israel, 58100 ; ² Pediatric Department, Wolfson Medical Centre, Sackler School of Medicine, Tel Aviv University, Holon, Israel, 58100 ; ³ Pediatric Infectious Disease Unit, Wolfson Medical Centre, Sackler School of Medicine, Tel Aviv University, Holon, Israel, 58100 ; ⁴ Pediatric Emergency Department, Wolfson Medical Centre, Sackler School of Medicine, Tel Aviv University, Holon, Israel, 58100 and ⁵ Pediatric Pulmonary Unit, Barzilai Medical Center, Ashkelon, The Faculty of Health Sciences, Ben Gurion University of the Negev, Ashkelon, Israel, 78278 .

Body: Background: Most acute wheezing episodes in preschool children are associated with viral respiratory tract infections, most commonly rhinovirus. Rhinovirus, like RSV, decreases extra-cellular ATP, leading to airway surface liquid dehydration. This, along with sub-mucosal edema, mucus plaques and inflammation cause failure of mucus clearance (MC). Such preschool children do not respond well to available treatments, including oral steroids. This calls for pro-MC and pro-hydration treatment like hypertonic saline. Methods: Randomized, controlled, double-blind study. Forty one children (mean age 31.9 ± 17.4 months, range 1-6 years) presented with wheezing to the emergency department (ED) were randomized after one albuterol inhalation to receive either 4 ml of Hypertonic Saline 5% (HS), (n=16) or 4 ml of Normal saline (NS), (n=25) both with 0.5 ml albuterol, twice every 20 minutes in the ED and four times a day thereafter if hospitalized. Primary outcome measured was length of stay (LOS) and secondary outcomes were admission rate (AR) and clinical severity score (CS). Results: LOS was significantly shorter in the HS than in the NS group: median (range) 2 (0-6) days, versus 3 (0-5) days ($P=0.027$). AR was significantly lower in the HS than the NS group: 62.2% versus 92%. CS improved significantly in both groups but did not reach significance between them.

Hospitalization rate

Outcomes	HS, N=16	NS, N=25	P value: HS v NS	All, N=41
Admission rate (%)	10 (62.2)	23 (92)	$P < 0.05$	33 (80)

Discharged home (%)	6 (38.8)	2 (8)		8 (20)
Length of stay, Median (range)	2 (0-5)	3 (0-6)	P< 0.03	2.7 (0-6)

Conclusions: Using HS inhalations significantly shortens LOS and lowers AR in preschool children presenting with acute wheezing episode to the ED.