

Background on HAPE

High altitude pulmonary edema (HAPE) is a type of noncardiogenic pulmonary edema seen at higher altitudes generally above 2,500m to 3,000m and is usually associated with travel.¹

Pediatric patients present with increased respiratory distress and tend to be afebrile, with temperatures no higher than **38.3C.**^{2,3,4}

There is an increased incidence of HAPE with underlying infections causing inflammation including upper respiratory infections, otitis media, and streptococcal pharyngitis.⁵

Objective/Rationale

In our clinic and hospital that is located in Frisco, CO (elevation 2,800m above sea level), we frequently see resident pediatric patients without recent travel presenting with respiratory tract infections and severe hypoxia with symptoms compatible with HAPE. Many of these children are diagnosed with pneumonia but have rapid and dramatic recovery with just high flow oxygen, without antibiotics. HAPE described in previous publications involve visitors to high altitude. In 1985, Fasules and colleagues published cases of HAPE in high altitude residents with no recent travel as well high altitude residents who developed HAPE after return from a lower elevation.⁶ The diagnoses was made on the basis of cardiac catheterization done in Leadville at 3,080 m. In our study, we identified three distinct types of HAPE: **Classic, Reentry, and Resident.**

Methods

Medical records of 52 patients with suspected HAPE seen in 2015 at **Ebert Family Clinic in Frisco, CO were reviewed** Patients studied lived in elevations between 2,440m to 3,500m Medical records were accessed through the electronic medical record system, EPIC, which was used at both clinic and hospital. Key findings documented for this study were clinical symptoms, vital signs, images including chest x-rays, residency status, and number of days since arrival to higher elevation.

High Altitude Pulmonary Edema in Mountain Children with No Recent Travel

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Results

| Age | Gen | Primary | Temp (C) | O2 Sat | Resident | Duration | Prior episode |
|---|---|--|---|--|---|--|---|
| | der | | | | | since arrival | |
| | | | | | | to high | |
| | | | | | | altitude | |
| 14 | Μ | Fever, URI | 37.7 | 85 | O * | Within past | None |
| | N/I | Eaver cough vomiting | 27 / | 96 | 0 | | Nono |
| 5 | | Fever cough otitis media | 27.2 | 86 | 0 | 4 uays | None |
| 6 | M | Fever cough rales otitis media | 37.8 | 86 | 0 | | None |
| 2 | M | URL, wheezing, pale, otitis media | 36.6 | 87 | 0 | | RSV. Flu (within 1 |
| - | | on , meezing, pare, other means | 0010 | | U | | mo) |
| 5 | М | Fever, cough, sore throat | 38.4 | 88 | 0 | - | RSV, Flu |
| 8 | Μ | Fever, cough, sore throat, wheezing | 37.1 | 88 | 0 | - | None |
| 4 | Μ | Fever, cough | 38.4 | 87 | 0 | - | X1 |
| 5 | Μ | Fever, cough, sore throat, rales | 38.1 | 84 | 0 | - | None |
| 14 | F | Fever, cough, sore throat | 38.5 | 94 | 0 | - | None |
| 5 | Μ | Fever, sore throat, wheezing, rales | 36.7 | 84 | 0 | - | X1 |
| 4 | Μ | Fever, cough, vomiting, rales | 38.5 | 84 | 0 | 6 days | X2 |
| 2 | F | Cough, rales | 37.8 | 85 | 0 | - | None |
| 5 | Μ | Fever, cough, otitis media | 38.2 | 88 | 0 | - | None |
| 6 | Μ | Fever, cough, wheezing, abdominal pain, otitis | 38.4 | 85 | 0 | - | X1 |
| | | media | | | | | |
| 4 | Μ | Cough, rales | 37.6 | 86 | 0 | 24 hours | None |
| 8 | Μ | Cough, URI , rales | 37.6 | 90 | 0 | - | None |
| 5 | Μ | Cough, otitis media | 37.8 | 87 | 0 | - | None |
| 3 | F | Fever, cough | 36.2 | 84 | 0 | - | None |
| 4 | M | Cough, rales | 39.6 | 72 | X** | 3 days | None |
| 4 | M | Fever, cough, sore throat, URI, otitis media | 37.5 | 82 | 0 | - | None |
| 3 | | Cough, sore throat, URI, wheezing | 37.0 | 84 | 0 | - | None |
| 5 | IVI | Cough, URI , wheezing | 37.8 | 8/ | 0 | - | X2 |
| 4 6 | _ | Fever, cough, wheezing | 37.4 | 84 | 0 | - | Nono |
| 15 | F | | 27.0 | 0.4 | • | | |
| 15 5 | F M | Fever, cough (Flu +), rhonchi | 37.0 | 84 | 0 | - | None |
| 15 5 8 | F M M | Fever, cough (Flu +), rhonchi Fever, cough, URI | 37.0 36.8 | 84 85 | 0 | - | None None |
| 15 5 8 6 | F M M M | Fever, cough (Flu +), rhonchi Fever, cough, URI URI , wheezing | 37.0 36.8 37.0 | 84 85 86 | 0 0 0 | - | None None X2 |
| 15 5 8 6 4 | F M M M F | Fever, cough (Flu +), rhonchi Fever, cough, URI URI , wheezing Fever, cough, URI , wheezing | 37.0 36.8 37.0 36.7 27.1 | 84 85 86 84 | 0 0 0 0 | - - - - | None None X2 X1 |
| 15 5 8 6 4 22mo | F M M F F | Fever, cough (Flu +), rhonchi Fever, cough, URI URI , wheezing Fever, cough, URI , wheezing Fever, cough ,URI | 37.0 36.8 37.0 36.7 36.7 37.1 | 84 85 86 84 86 86 | 0 0 0 0 0 | - - - - 48 hrs | None None X2 X1 None None |
| 15 5 8 6 4 22mo 5 5 | F M M F F F M | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URIFever, cough , URIFever, cough , URIFever, cough , URI | 37.0 36.8 37.0 36.7 36.7 37.1 37.6 28 4 | 84 85 86 84 86 85 85 | 0 0 0 0 0 0 | - - - 48 hrs - | None X2 X1 None None None None None |
| 15 5 8 6 4 22mo 5 7 7 | F M M F F F M M | Fever, cough (Flu +), rhonchi Fever, cough, URI URI , wheezing Fever, cough, URI , wheezing Fever, cough ,URI Fever, cough Fever, cough Fever, URI , rhonchi, wheezing, otitis media | 37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 36.8 | 84 85 86 84 86 85 85 86 86 | 0 0 0 0 0 0 0 0 | - - - 48 hrs - - | None X2 X1 None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 10 7 | F M M F F F M M M | Fever, cough (Flu +), rhonchi Fever, cough, URI URI , wheezing Fever, cough, URI , wheezing Fever, cough ,URI Fever, cough ,URI Fever, cough Fever, URI , rhonchi, wheezing, otitis media Fever, cough, crackles, otitis media | 37.0 36.8 37.0 36.7 36.7 37.1 37.6 38.4 38.4 36.8 37.2 | 84 85 86 84 86 85 85 86 86 86 82 | 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - | None X2 X1 None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 10 7 | F M M F F F M M M M | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough ,URIFever, cough ,URIFever, cough , URI , rhonchi, wheezing, otitis mediaFever, cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, grunting | 37.0 36.8 37.0 36.7 36.7 37.1 37.6 38.4 36.8 36.8 37.2 | 84 85 86 84 86 86 85 86 86 86 82 | 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - | None X2 X1 None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 7 10 7 3 | F M M F F M M M M M | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URI , wheezingFever, cough , URIFever, cough , URIFever, cough , crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, crackles | 37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 36.8 36.8 37.2 37.2 | 84 85 86 84 86 85 86 86 86 86 82 82 85 | 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - | None X2 X1 None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 7 10 7 10 7 3 3 | F M M F F M M M M M M F | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough ,URIFever, cough ,URIFever, cough ,URIFever, cough , Crackles, otitis mediaFever, cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, crackles | 37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 38.4 36.8 37.2 37.2 37.0 | 84 85 86 84 86 85 86 86 86 86 82 82 82 85 | 0 0 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - - - | None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 7 10 7 10 3 3 | F M M M F F M M M M M F F | Fever, cough (Flu +), rhonchi Fever, cough, URI URI , wheezing Fever, cough, URI , wheezing Fever, cough ,URI Fever, cough ,URI Fever, cough , URI Fever, cough, crackles, otitis media Fever, cough, crackles, otitis media Fever, cough, vomiting, abdominal pain, rales, grunting Fever, cough, abdominal pain, crackles Cough, vomiting, URI , rales | 37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 36.8 36.8 37.2 37.2 37.0 37.0 | 84 85 86 84 88 88 88 88 88 88 88 88 88 88 88 82 88 85 85 85 85 85 83 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - - - | None None X2 X1 None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 7 10 7 10 7 3 3 3 16mo 3 3 | F M M M F F M M M M M F F F F | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URIFever, cough , URIFever, coughFever, cough , crackles, otitis mediaFever, cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, cracklesCough, vomiting, URI , ralesURI , ralesFever, cough abdominal pain | 37.0 36.8 37.0 36.7 37.1 37.6 38.4 38.4 36.8 37.2 37.2 37.0 37.0 37.4 37.4 | 84 85 86 86 85 86 85 < | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - - - - 24 hrs | None X2 X1 X0 None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 7 10 7 10 7 3 3 3 16mo 3 3 16mo | F M M M F F M M M M M F F F F F F | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URI , wheezing, otitis mediaFever, cough , URI , rhonchi, wheezing, otitis mediaFever, Cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, cracklesCough, vomiting, URI , ralesURI , ralesFever, cough abdominal painFever, cough abdominal pain | 37.0 36.8 37.0 36.7 36.7 37.6 37.6 38.4 36.8 36.8 37.2 37.2 37.0 37.4 37.4 37.4 | 84 85 86 84 86 85 86 86 86 86 82 82 82 85 73 85 73 85 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - - 24 hrs - | None None None None None None None None |
| 15 5 8 6 4 22mo 5 7 10 7 10 7 10 3 3 3 16mo 3 3 16mo 3 16mo | F M M M F F M M M M M F F F F F F F M F | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URIFever, cough , URIFever, cough , URI , rhonchi, wheezing, otitis mediaFever, cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, cracklesCough, vomiting, URI , ralesURI , ralesFever, cough abdominal painFever, cough abdominal pain | 37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 36.8 37.2 37.2 37.2 37.4 37.4 37.4 37.4 | 84 85 86 84 86 85 86 86 86 86 86 85 85 82 85 85 85 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - - 24 hrs - | None X2 X1 X1 None None None None None None None None |
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| 115 3 8 3 4 22m0 5 7 10 10 10 3 4 3 16m0 3 12m0 12m0 12m0 12m0 12m0 | F M M M F M M F <td< td=""><td>Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URIFever, cough , URIFever, cough , Crackles, otitis mediaFever, cough, crackles, otitis mediaFever, cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, cracklesVRI , ralesFever, cough abdominal painFever, cough, URI , rales, otitis mediaFever, cough, URI , rales, otitis mediaFever, cough, URI , ralesFever, cough, URI , rale</td><td>37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 36.8 36.8 37.2 37.2 37.2 37.4 37.4 37.4 37.4 37.4 37.4 37.4 37.4</td><td>84 85 86 84 86 86 85 86 86 86 87 86 86 86 86 86 86 87 886 886 886 886 886 885 885 885 885 885 885 885 885 885 885 885 885 885 885 885 885 885 886 885 885 885 885 886 882 882 882 882 882</td><td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td><td>- - - 48 hrs - - - - - - 24 hrs - - 24 hrs - - - 24 hrs - -</td><td>NoneNoneX2X1None<</td></td<> | Fever, cough (Flu +), rhonchiFever, cough, URIURI , wheezingFever, cough, URI , wheezingFever, cough , URIFever, cough , URIFever, cough , Crackles, otitis mediaFever, cough, crackles, otitis mediaFever, cough, crackles, otitis mediaFever, cough, vomiting, abdominal pain, rales, gruntingFever, cough, abdominal pain, cracklesVRI , ralesFever, cough abdominal painFever, cough, URI , rales, otitis mediaFever, cough, URI , rales, otitis mediaFever, cough, URI , ralesFever, cough, URI , rale | 37.0 36.8 37.0 36.7 37.1 37.6 37.6 38.4 36.8 36.8 37.2 37.2 37.2 37.4 37.4 37.4 37.4 37.4 37.4 37.4 37.4 | 84 85 86 84 86 86 85 86 86 86 87 86 86 86 86 86 86 87 886 886 886 886 886 885 885 885 885 885 885 885 885 885 885 885 885 885 885 885 885 885 886 885 885 885 885 886 882 882 882 882 882 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | - - - 48 hrs - - - - - - 24 hrs - - 24 hrs - - - 24 hrs - - | NoneNoneX2X1None< |

Table of HAPE patients ages 12 months to 15 years of 2015. Clinic draws from five county area above 2500 meters with populations of 5000-29000 Patients seen in 2015: 1637 with 4230 total visits.

*O indicates that the patient is a resident of an high altitude region. **X indicates that the patient is a visitor to high altitude region.

Ebert Family Clinic, Frisco, CO, USA



| Diagnosis | Outcome (N=52) |
|----------------------|----------------|
| Classic HAPE | 2 (4%) |
| Reentry HAPE | 7 (13%) |
| Resident HAPE | 35 (67%) |
| Asthma attack | 2 (4%) |
| Pneumonia | 6 (12%) |
| | |

- **Resident**.
- (elevation 2,800m)
- patients.
 - 2001 Fall;2(3):389-403.

Result Summary

Conclusion

• 3 different categories of high altitude pulmonary edema can be recognized based on the etiology indicated by the patient's residency/travel history; Classic, Reentry,

 72% of pediatric patients with clinical features consistent with HAPE were found to have Resident HAPE at our clinic

 Clinical diagnosis by experienced providers can avoid misdiagnosis, unnecessary antibiotics, and prevent episodes of both resident and reentry HAPE in pediatric

References

Bartsch P, et al. Physiological aspects of high-altitude pulmonary edema. *J Appl Physiol (1985).* 2005 Mar;98(3):1101-10.

Duster MC and Derlet MN. High-altitude illness in children. *Pediatr Ann.* 2009 Apr;38(4):218-23. Yaron M, et al. Evaluation of diagnostic criteria and incidence of acute mountain sickness in preverbal children. *Wilderness Environ Med.* 2002 Spring;13(1):21-6. Pollard AJ, et al. Children at high altitude: an international consensus statement by an ad hoc

committee of the International Society for Mountain Medicine, March 12, 2001. High Alt Med Biol.

Durmowicz AG, et al. Inflammatory processes may predispose children to high-altitude pulmonary edema. *J Pediatr.* 1997 May;130(5):838-40. Fasules JW, Wiggins JW, Wolfe RR. Increased lung vasoreactivity in children from Leadville,

Colorado, after recovery from high-altitude pulmonary edema. Circulation. 1985 Nov;72(5):957-