

The Need for Oxygen Therapy in Periodic Paralysis

By Susan Q. Knittle-Hunter

Some people who have Periodic Paralysis may need oxygen therapy. I am one of them. I first noticed a breathing problem during total paralytic episodes. I was unable to move in any way, speak, or open my eyes. I had tachycardia and palpitations of my heart and I was having difficulty breathing. It would actually stop for a few seconds at a time. It felt like an elephant sitting on my chest. It was very frightening. Soon the difficulty of taking breaths in and out began to happen when I was not in paralysis. I found it more and more difficult to breathe. Every time I stood up, ate a meal or exerted myself in anyway, the breathing got worse and my heart would speed up until it was beating 130 to 140 beats per minute, even while I was eating.

Finally, I was tested and it was discovered that my oxygen levels recorded on an oximeter were dipping into seriously low levels during total paralysis episodes and upon any type of exertion. I was put on oxygen therapy for the periods of time I was in paralysis and during the night when I had my most serious episodes. It was not long before I realized I needed it 24 hours a day.

I am doing much better now that I am on oxygen therapy. I am having less episodes of the paralysis and the severe tachycardia has eased. I am breathing much easier. I did not understand just why I needed the oxygen and how it helped, so I did some research and the following is what I discovered.

The potassium shifting and depletion that occurs in Periodic Paralysis (PP) affects all the muscles of the body including the heart muscle and the respiratory (breathing) muscles. The muscles can become permanently weakened and this includes the heart and breathing muscles. This weakness of the heart muscle and breathing muscles can be fatal in Periodic Paralysis. The diaphragm is the primary 'breathing muscle'. The intercostal muscles are secondary breathing muscles. Breathing involves all the muscles from mouth to lower abdomen.

If the organs are deprived of oxygen, the heart and the rest of the body are working harder to stay alive. This can cause an individual with PP to develop hypoventilation. This is a condition in which one is barely breathing due to weak breathing muscles which prompts him to breath less and less over time. Eventually he will get accustomed to getting by on less oxygen while excess carbon dioxide is stored in his muscles and organs. This can cause long-term problems including damage to most of the organs and muscles in the body, but the heart and brain are particularly vulnerable. Oxygen therapy may be necessary at this point.

Based on the above information, it is important to understand that when someone with Periodic Paralysis begins to hyperventilate during an episode with tachycardia, this is due to the body trying to compensate by expelling the excess carbon dioxide. This is a good thing, though he may be trying to stop the process, because it may be scary.

And so, if an individual, who may or not be on oxygen therapy, begins to have difficulty breathing during an episode of partial or total paralysis or at any time; he may get some relief if he breathes in through his nose and breathes out as hard as he can through his mouth to expel the carbon dioxide. It is good to do this until the breathing becomes easier.

One can develop a serious condition of metabolic acidosis if the carbon dioxide levels are allowed to rise and remain in the body. "A metabolic acidosis can cause significant physiological effects, particularly affecting the respiratory and cardiovascular systems." Metabolic acidosis can cause "Shift of K⁺ out of cells causing Hyperkalemic." ('Acid-base pPhysiology' by Kerry Brandis, 1981). Hyperkalemia (high levels of potassium) and metabolic acidosis (a pH imbalance in which the body has accumulated too much acid and does not have enough bicarbonate to effectively neutralize the effects of the acid) can be life-threatening.

Some individuals with Periodic Paralysis and Andersen-Tawil Syndrome must be careful with exercise if they begin to have trouble breathing while exerting themselves. It is best not to make your body work too hard because it can be due to exercise intolerance and it can cause the adrenalin to run thus causing potassium shifting, and the cycle can begin anew; weakening the muscles and organs and it can cause tachycardia and arrhythmias which can include the long QT interval heartbeat which can cause cardiac arrest. Or, it may be that one's breathing organs and cardiac muscles are weakening and oxygen therapy may be indicated to ease the excess work of the heart and other organs.

If an individual with Period Paralysis begins to have breathing problems it would be best to have it checked out with your Primary Care Physician. The doctor can refer you to a pulmonologist or have your oxygen levels tested using an oximeter with a recorder overnight or for 24 hours.

I now understand why I need to use oxygen. Over the years of potassium depletion and shifting, my cardiac and breathing muscles have become weak and cannot do the job they need to do. My heart is working overtime. Hypoventilation has developed. My breathing has become too shallow and my lungs cannot expel the buildup of carbon dioxide. Damage has been done to most of the organs in my body due to the buildup, including my heart, my breathing muscles and my brain. The oxygen eases the excess work of the heart and other organs, and aides in expelling carbon dioxide.

However, due to the body-wide organ damage, I am unable to do anything that requires any exertion. I get worn out very easily and the tachycardia begins quickly. This is also due to the exercise intolerance I experience because of Andersen-Tawil Syndrome.

References:

<http://www.periodicparalysis.org/CMFiles/PPA-EmergencyInformation-B.pdf>

<http://www.answers.com/topic/> Paralysis may be localized or generalized but can extend to facial, bulbar and **respiratory muscles** and **can be fatal**

http://hkpp.org/faq/hypokalemic_periodic_paralysis.html

muscle tissue is damaged by attacks and this damage may eventually cause permanent weakness in some patients once they reach their 50s and 60s

<http://www.answers.com/topic/hypokalemia>

[Respiratory depression](#)

(Hypoventilation) from severe impairment of skeletal muscle function is found in many patients.

(Hypoventilation) Abnormally slow and shallow respiration, resulting in an increased level of carbon dioxide in the blood.

<http://www.nlm.nih.gov/medlineplus/ency/article/002377.htm>

Hypoventilation is too shallow or too slow breathing, which does not meet the needs of the body. It may also refer to reduced lung function.

If a person hypoventilates, the body's carbon dioxide level rises, which results in too little oxygen in the blood.

<http://www.jrnc.org/adam/ency/article/000312.htm>

Weakness most commonly affects the muscles of the arms and legs, but it may occasionally affect the eye muscles or the muscles involved in breathing and swallowing (which can be fatal).

http://www.muscular-dystrophy.org/about_muscular_dystrophy/conditions/126_periodic_paralyses

In the great majority of patients with periodic paralysis the heart muscle is not involved.

<http://quest.mda.org/series/focus-periodic-paralysis/pp-it%E2%80%99s-all-muscles-not-head>

There are three major [periodic paralyses](#): *hyperkalemic* (high potassium) periodic paralysis, *hypokalemic* (low potassium) periodic paralysis, and *Andersen-Tawil syndrome*, explains Louis Ptacek, a neurologist who specializes in the study and treatment of ion channel diseases at the University of California at San Francisco. The first two affect only the channels in skeletal muscles. The last affects ion channels in both skeletal and cardiac muscles.

<http://quest.mda.org/series/focus-periodic-paralysis/focus-periodic-paralysis>

The underlying cause of Andersen-Tawil syndrome is any of a number of genetic mutations in a chromosome 17 gene for a potassium ion channel present in both skeletal and cardiac muscle tissue.

<http://medical-dictionary.thefreedictionary.com/Paralyses%2c+familial+periodic>

Severe respiratory weakness from hypokalemic PP may require intensive care to ensure adequate ventilation. Potassium chloride may be given by mouth or intravenously to normalize blood levels.

http://www.sirirajmedj.com/content.php?content_id=2284

The symptoms usually occur during the patient's sleep and have a paralysis attack when they wake up. The swallowing muscles and eye muscles are usually normal as well as the diaphragm. The intercostal muscle may also be weak. HypoPP does not affect the cardiac muscle, only the ECG change due to hypokalemia can be observed.

<http://www.thefreelibrary.com/Hypokalemia+and+acid+base+balance-a0191186101>

There are a number of potentially serious problems associated with hypokalemia such as: Neuromuscular manifestations such as fatigue, paralysis, weakness, respiratory muscle dysfunction, and rhabdomyolysis. Gastrointestinal problems include constipation and ileus. There are a number of cardiac arrhythmias and ECG changes that can occur such as prominent U waves, T wave flattening, and ST segment changes.

<http://en.wikipedia.org/wiki/Hypokalemia>

Mild hypokalemia is often without symptoms, although it may cause a small elevation of blood pressure,^[2] and can occasionally provoke cardiac arrhythmias. Moderate hypokalemia, with serum potassium concentrations of 2.5-3 mEq/L, may cause muscular weakness, myalgia, and muscle cramps (owing to disturbed function of the skeletal muscles), and constipation (from disturbed function of smooth muscles). With more severe hypokalemia, flaccid paralysis and hyporeflexia may result. There are reports of rhabdomyolysis occurring with profound hypokalemia with serum potassium levels less than 2 mEq/L. Respiratory depression from severe impairment of skeletal muscle function is found in many patients.

<http://medical-dictionary.thefreedictionary.com/metabolic+acidosis>

Metabolic acidosis is a pH imbalance in which the body has accumulated too much acid and does not have enough bicarbonate to effectively neutralize the effects of the acid.

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