"It's Your Call" - Solution
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1) <u>Are there any findings here that require immediate action on your part?</u>

This patient's rapid, shallow respirations are worrisome, and her hypoxia is more so. An SpO2 of 88% might be baseline for an adult patient with COPD, but an 11-year-old with a benign medical history should not be below the mid-90s. She needs treatment to improve her oxygenation as well as further assessment of her respiratory status.

2) <u>Would you prefer to give oxygen by mask or assist ventilations?</u>

Only someone at the scene can make this call. A frequent mistake of the novice is to put an oxygen mask on a patient with inadequate breathing, and fail to assist respirations. Remember too that children with increased respiratory effort can quickly become exhausted, and it becomes essential for us to take over their work of breathing.
However, very few conscious patients tolerate ventilatory assistance easily, and this girl's rapid respiratory rate may make it difficult to assist her breathing.
Whether you opt for high-flow oxygen by mask, or an attempt at ventilatory assistance, evaluate the effectiveness of your intervention very carefully and be ready to adopt a new strategy if the first one doesn't succeed.

3) <u>Does this child's presentation fit the pattern of a "GI bug?" Or your partner's assumption of hyperventilation syndrome?</u>

Neither. A GI complaint could account for nausea and vomiting, and even her lethargic affect, but not the tingling of the mouth or extremities. Your partner's suspicion of hyperventilation syndrome would account for all the tingling, as well as the tachypnea, but it wouldn't cause hypoxia.

4) <u>Are there any syndromes that do match these signs and symptoms? Which?</u>

There is one syndrome – dangerous, but fortunately rather rare – that accounts for these signs and symptoms and is consistent with this girl's history: paralytic shellfish poisoning. It is caused by a class of substance called saxitoxins that are produced by certain kinds of algae known as dinoflagellates. Filter feeding shellfish consume the algae and concentrate this toxin in their tissues, where it can poison human beings who eat the shellfish.

Let's assume you quiz your patient's parents on what was in the chowder, and you find it contained a variety of seafood, including some mussels. As it turns out, blue mussels can develop the highest levels of saxitoxin of any shellfish in Alaska.

The signs and symptoms of PSP can start a few minutes after eating contaminated shellfish or as much as 10 hours later. Usually the first signs appear within two hours.

Numbness of the mouth and lips is by far the most common symptom of PSP and usually the first to occur. There is a wide variety of other signs and symptoms whose occurrence and timing is hard to predict. Numbness may spread to the face and neck, and in more severe cases to the extremities. Headache, dizziness, nausea and abdominal pain may develop but are less consistent. Slurred speech, ataxia and sometimes a "floating feeling" have been reported. In severe poisonings, the victim may have difficulty swallowing. Generalized weakness may occur. Most patients remain fully conscious.

The greatest danger is weakness of respiratory muscles that can cause hypoventilation or apnea.

5) Given the answer to question 4, what patient care considerations must you bear in mind?

If you're not giving ventilatory assistance yet, be prepared to start at any time. Perform standard airway maintenance and be

ready for suctioning. Depending on the transport time, managing her with a bag and mask while maintaining cricoid pressure may be the best strategy. Otherwise an airway adjunct may be needed.

Saxitoxins are adsorbed by activated charcoal; but oral medications are contraindicated in patients with reduced consciousness. So assess any PSP patient for the ability to swallow safely. Don't delay in seeking an order for the charcoal, as its effectiveness is greatest soon after the shellfish ingestion. Some sources say it is ineffective if given more than about four hours afterward.

If the patient can safely drink and swallow, Medical Command might also order sodium bicarbonate solution. Some saxitoxins are converted to more toxic forms in an acid environment like our stomachs, so drinking a bicarb solution to alkalinize the GI tract may reduce the severity of the poisoning. This too will require contact with Medical Command in most EMS systems.

A patient with respiratory failure from PSP will generally recover as long as an airway is maintained and respirations are supported. Within about 12 hours breathing will usually be adequate again, though the patient may be weak for days.

6) Are there other urgent EMS priorities must you consider at this scene? What are these priorities?

Definitely! In this scenario others have eaten the chowder. Is it possible they will need emergency care?

Toxin levels will vary in different types of shellfish, different individual shellfish and even in different parts of a given shellfish. Therefore people can eat from the same bowl and still end up ingesting very different amounts of poison. Also, symptom onset seems to vary from one person to another. Children may be more sensitive to saxitoxins, but your patient's parents could still become sick themselves.

In general if one person shows signs or symptoms of PSP, then consider everyone
who ate the same dish to be poisoned as

well. Give each one a dose of oral charcoal (if safe to do so, and if ordered by Medical Command) regardless of whether they are yet showing signs or symptoms. Transport each to a medical facility for evaluation.

Important safety information

Shellfish contaminated by saxitoxins look, smell and taste normal, and the poison is unaffected by cooking. Crabmeat does not accumulate the toxin, but the crab's viscera may hold contaminated material the crab consumed. Clean crabs of viscera before boiling.

Shellfish sold commercially is tested and may be assumed safe, but those who gather their own shellfish take on some degree of risk unless they are at one of the few certified beaches (listed at http://www.dec.state.ak.us/eh/fss/seafood/psp/beach.htm) where the Alaska Department of Environmental Conservation tests the shellfish.

Most cases of PSP occur during the late spring or summer, but because the saxitoxin is long lasting, some danger persists throughout the year.

For further information:

Some good websites with information on PSP are listed below:

http://aquaticpath.epi.ufl.edu/waterbiology/PSP-LEF.html

http://www.doh.wa.gov/ehp/sf/Pubs/PSPfactSheet.htm

http://www.cdc.gov/ncidod/dbmd/diseaseinfo/marinetoxins_g.htm

http://seagrant.uaf.edu/features/PSP/psp_page.html

http://www.dec.state.ak.us/eh/fss/seafood/psp/psp.htm