Laryngo-Onycho-Cutaneous Syndrome

Subjects: Genetics & Heredity
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Laryngo-onycho-cutaneous (LOC) syndrome is a disorder that leads to abnormalities of the voicebox (laryngo-), finger- and toenails (onycho-), and skin (cutaneous).

Keywords: genetic conditions

1. Introduction

Many of the condition's signs and symptoms are related to the abnormal growth of granulation tissue in different parts of the body. This red, bumpy tissue is normally produced during wound healing and is usually replaced by skin cells as healing continues. However, in people with LOC syndrome, this tissue grows even when there is no major injury.

One of the first symptoms in infants with LOC syndrome is a hoarse cry due to ulcers or overgrowth of granulation tissue in the voicebox (the larynx). Excess granulation tissue can also block the airways, leading to life-threatening breathing problems; as a result many affected individuals do not survive past childhood.

In LOC syndrome, granulation tissue also grows in the eyes, specifically the conjunctiva, which are the moist tissues that line the eyelids and the white part of the eyes. Affected individuals often have impairment or complete loss of vision due to the tissue overgrowth.

Another common feature of LOC syndrome is missing patches of skin (cutaneous erosions). The erosions heal slowly and may become infected. People with LOC syndrome can also have malformed nails and small, abnormal teeth. The hard, white material that forms the protective outer layer of each tooth (enamel) is thin, which contributes to frequent cavities.

LOC syndrome is typically considered a subtype of another skin condition called junctional epidermolysis bullosa, which is characterized by fragile skin that blisters easily. While individuals with junctional epidermolysis bullosa can have some of the features of LOC syndrome, they do not usually have overgrowth of granulation tissue in the conjunctiva.

2. Frequency

LOC syndrome is a rare disorder that primarily affects families of Punjabi background from India and Pakistan, although the condition has also been reported in one family from Iran.

3. Causes

LOC syndrome is caused by mutations in the *LAMA3* gene, which provides instructions for making one part (subunit) of a protein called laminin 332. This protein is made up of three subunits, called alpha, beta, and gamma. The *LAMA3* gene carries instructions for the alpha subunit; the beta and gamma subunits are produced from other genes.

The laminin 332 protein plays an important role in strengthening and stabilizing the skin by helping to attach the top layer of skin (the epidermis) to underlying layers. Studies suggest that laminin 332 is also involved in wound healing. Additionally, researchers have proposed roles for laminin 332 in the clear outer covering of the eye (the cornea) and in the development of tooth enamel.

The mutations involved in LOC syndrome alter the structure of one version of the alpha subunit of laminin 332 (called alpha-3a). Laminins made with the altered subunit cannot effectively attach the epidermis to underlying layers of skin or regulate wound healing. These abnormalities of laminin 332 cause the cutaneous erosions and overgrowth of granulation tissue that are characteristic of LOC syndrome. The inability of laminin 332 to perform its other functions leads to the nail and tooth abnormalities that occur in this condition.

3.1. The gene associated with Laryngo-onycho-cutaneous syndrome

- LAMA3

4. Inheritance

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

5. Other Names for This Condition

- JEB-LOC
- laryngoonychocutaneous syndrome
- LOC syndrome
- LOCS
- LOGIC syndrome
- Shabbir syndrome

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