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Informationsportal zu Krebserkrankungen bei Kindern und Jugendlichen

Tumours of the throat and larynx (Brief information)

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KINDER KREBS STIFTUNG

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Tumours of the throat (pharynx) and voice box (larynx) can be either benign or malignant. However, they are rare in childhood and adolescence; in Germany, less than ten children or adolescents develop such a tumour per year.

Hence, there are no therapy studies providing the optimal treatment strategy that has been proven for many patients, as there are for other tumours in childhood and adolescence. However, the experts of the Registry for Rare Diseases in Paediatrics (German abbreviation: STEP, for "**S**eltene **T**umor**e**rkrankungen in der **P**ädiatrie") have summarized their experiences as well as the experiences of international research groups on the following pages.

Since every child is different, it is important to individually adjust the treatment to every single patient. Therefore, “STEP” offers free advice via a tumourboard attended by multidisciplinary experts. Feel free to have your attending physician to contact the experts at “STEP” at *step@klinikumdo.de*. Also, by registering your child with the „STEP“ registry, you get the option to help expanding the experience with these rare tumours, thereby helping other children who are diagnosed with such a disease in the future.

The following paragraphs provide information on throat and laryngeal tumours that occur in childhood and adolescence.

1. Introduction to the throat and larynx

The tubelike throat (pharynx) connects the nose with the voice box (larynx). It also forms the connection between the oral cavity and the esophagus, thereby serving both as a food- and airway.

The funnel-shaped voice box connects the throat with the trachea. Its upper end is firmly attached to the tongue’s hyoid, its lower end connects to the trachea. The larynx has three chores:

- It allows unhindered air passage.
- It provides for a closing mechanism that seals the airways during swallowing, so that food won’t get into the lungs.
- It is the most important organ for phonation.

2. Disease: what is a throat or laryngeal tumour?

Different types of benign and malignant *tumour*s can occur in the throat and larynx; they arise from the various anatomical structures in this area (such as *epithelial tissue* or muscle tissue).

2.1. Squamous cell carcinomas

Very rare malignant tumours in childhood and adolescence are the squamous cell *carcinoma*s, which arise from the squamous epithelium of the mucous membranes in the throat and larynx. For the timeframe 1968 – 2003, literature reports on 60 patients with squamous cell carcinoma in this age group, most of them between 10 and 15 years of age. Only few have been reported for preschool children. Patients with *Fanconi anaemia* are considered a special group (*see chapter „Causes“ and „Symptoms“*).

An extremely rare tumour of this region is the NUT carcinoma, which also arises from squamous epithelium. In Germany, it is diagnosed about once a year and is named after a specific *gene* aberration (NUT) that is found in this tumour. NUT carcinoma can develop at any site of the body (such as head and neck, chest, abdomen, each relatively close to the body's midline), behaves very aggressively and can spread widely. Therefore, these tumours require an intensive therapy. Please seek advice in case of this diagnosis (*step@klinikumdo.de*).

2.2. Soft tissue tumours

Tumours of the larynx muscle (*rhabdomyosarcoma*s) are a bit more frequent. Explicit treatment recommendations by the German Soft Tissue Sarcoma Registry (SoTiSar) are available for those *soft tissue sarcoma*s. *For information on soft tissue tumours, see here.*

2.3. Germ cell tumours

Teratomas and other malignant *germ cell tumour*s do also occur in this region. Patients with those tumours are treated according to the *MAKEI protocol*.

2.4. Vascular tumours

The last disease group includes vascular tumours (hemangiomas or or lymphangiomas). Classic *hemangioma*s in infancy respond to treatment with beta blockers (propanolol) within the first year of life. Other tumours, such as *lymphangioma*s, need to be removed surgically. Partially, surgery is combined with a sclerosing therapy. This treatment (also called sclerotherapy or obliteration) involves injection of a pro-inflammatory solution into the lymphangioma, which finally causes scarring, thereby making the tumor tissue shrink. Aside from this, there now are medication-based approaches that may be used successfully for some lymphangiomas. Don't hesitate to seek advice on this.

3. Causes: how do throat or laryngeal tumours develop?

In contrast to children and adolescents, the most frequent cause for squamous cell carcinomas in adults is nicotin and alcohol abuse. The diseases occurring in childhood or adolescence, however, are often seen in association with human papilloma virus (HPV) *infection*. The infection can be transferred via the airways or from the mother to the child during childbirth. It needs to be mentioned

here, though, that many children are positive for this *virus* without being diagnosed with a malignant tumour. Hence, additional factors (for example *genetic* ones), which haven't been identified yet, may also play an important role in the development of larynx and throat cancers.

In addition, certain hereditary diseases, such as Fanconi anaemia, are associated with an increased risk to develop squamous cell carcinomas in the throat and lanrynx region. Since there is a predisposition for developing other cancers as well, Fanconi anaemia is also known as a cancer predisposition syndrome.

4. Symptoms: what are the signs of the disease?

The major *symptom*s of a larynx or throat tumour are hoarseness, cough, respiratory distress and difficulty of swallowing.

Note: because of their increased risk of tumour development (*see chapter "Causes"*), children and adolescents with Fanconi anaemia should, even if asymptomatic, be monitored regularly with regard to tumours of the throat and larynx with the beginning of puberty.

5. Diagnosis: what kinds of tests are required?

Usually, the doctor will take a detailed history (*anamnesis*) and perform a *physical examination* including a laryngoscopy and throat inspection. Laryngoscopy is done to closely assess throat and larynx; it involves a thin tube with a lens and lights being positioned in the throat after passing tongue and uvula. If laryngoscopy raises suspicion of a tumour, the next step includes assessing the tumour by *endoscopy*.

Imaging diagnostics such as *ultrasound* (sonography), *magnetic resonance tomography* (MRT, layered scanning of the body using magnetic fields and radio waves) and/or *computed tomography* (CT, detailed x-ray slices of the body) help to obtain information on the tumour's location, its size, extent and growth pattern. When dealing with children and adolescents, not using techniques on the basis of *X-rays* is the goal, therefore, ultrasound and magnetic resonance tomography are the standards.

Good to know: There are no laboratory results that are specifically indicative of a throat or laryngeal tumour.

Psychosocial Care

A child's cancer is a stressful situation for the whole family. The psychosocial team of the clinic or later the aftercare facility provides advice and support to patients and their relatives from diagnosis to completion of treatment as well as during aftercare. Don't hesitate to take advantage of this offer. It is an integral part of the treatment concept of all paediatric oncology centres in many countries. Here you will find comprehensive information on this.

6. Therapy: how is treatment done?

Treatment of children and adolescents with a tumour of the throat or larynx should take place in a children's hospital with a paediatric oncology program. Only such a childhood cancer centre

provides highly experienced and qualified staff (doctors, nurses and many more), since they are specialised and focussed on the diagnostics and treatment of children and teenagers with cancer according to the most ad-vanced treatment concepts.

Complete surgical removal of the tumour is crucial as is not damaging important structures during the procedure. In case the tumour is too large for *surgery* or in unfavourable proximity to vital adjacent organs, an attending or preceding *radiotherapy* combined with *chemotherapy* is an option, too. Additional medications are currently being studied.

7. Prognosis: what are the chances of cure?

Since they are such a rarity, a statement on the *prognosis* of these tumours is hard to make. The chances of cure for children and adolescents with throat and larynx tumours mainly depend on the tumor type and on whether total tumour resection was doable.

Extensive squamous cell carcinomas and NUT carcinomas can be lethal despite intensive treatment. However, combined chemo- and radiotherapy can also lead to longterm survival.

Treatment can cause speech impairment. Hoarseness is quite frequent. Therefore, thorough follow-up of the patients by specialised paediatricians and ENT doctors even after completion of treatment is very important.

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Glossary

anamnesis	medical interview, a patient's history, development of signs of illness; the type, onset and course of the (current) symptoms as well as any risk factors (e.g. hereditary diseases) are evaluated during a medical interview.
carcinoma	malignant tumour resulting from degenerated epithelial tissue (e.g. skin, mucous membranes, glandular tissue);
chemotherapy	here: use of drugs (chemotherapeutic agents, cytostatics) for the specific inhibition of tumor cells in the organism
computed tomography	imaging, X-ray diagnostic procedure; it produces an image by computer-controlled evaluation of a large number of X-rays from different directions. This makes it possible to produce sliced images of body parts (tomograms, transverse or longitudinal sections of the human body)
endoscopy	illumination and observation of body cavities and hollow organs with an endoscope; the specific designation depends on the organ being examined (e.g. gastroscopy = endoscopy of the stomach; laparoscopy = endoscopy of the organs in the abdomen); used as a diagnostic procedure with the opion of taking a tissue sample (biopsy), as a therapeutic procedure, e.g. for performing minor surgical procedures under imaging control
epithelial tissue	a closed group of cells that lines or borders the external or internal surfaces of the body in one or more layers; epithelial tissues include, for example, the skin, mucous membranes of the oral cavity, oesophagus, stomach and intestines, lining of the urinary bladder, renal pelvis, fallopian tubes, uterus and trachea. As covering and glandular tissue, epithelial tissue fulfils the following functions: protection, mass exchange and sensation/ signal transmission. The epithelium is one of the four basic tissue types, along with muscle, nerve and connective tissue.
Fanconi anaemia	hereditary haematopoietic disorder; it is mainly characterized by a progressive dysfunction of the bone marrow, which leads to a reduced formation of blood cells (bone marrow insufficiency), as well as by chronic anaemia and a high risk of cancer (especially for acute myeloid leukaemia). Other concomitant symptoms include skeletal malformations (e.g. short stature, malformations of the thumbs and arms). Fanconi anemia is one of the cancer predisposition syndromes. At the cellular level, there

	is an increased chromosomal fragility; this leads to chromosomal changes and, as a result, to disorders of cell cycle control.
gene	unit of genetic information in the genome of living organisms; a gene contains the genetic information – the blueprint – for a specific gene product (protein or RNA). In most organisms, the entirety of all genes, the genome, is present as a deoxyribonucleic acid chain (DNA), which forms the chromosomes in the cell nucleus. The information of a gene is mediated by a certain sequence of the nucleic acid building blocks adenine, guanine, cytosine and thymine.
genetic	concerning the (level of) inheritance or genes; inherited
infection	penetration of the smallest organisms (e.g. bacteria, viruses, fungi) into the body and subsequent multiplication within it. Depending on the characteristics of the microorganisms and the immune system of the infected person, various infectious diseases can occur after infections.
physical examination	an important part of diagnostic examinations; includes palpation and listening to certain body organs as well as testing reflexes to obtain indications of the nature or course of a disease.
prognosis	prediction of the course and outcome of a disease / prospect of recovery
radiotherapy	controlled use of ionizing (high-energy) radiation for the treatment of malignant diseases
rhabdomyosarcoma	the most common soft tissue sarcoma in childhood and adolescence
soft tissue sarcoma	a variety of very different malignancies that originate from soft tissues, e.g. connective, fat, muscle or peripheral nerve tissue; they account for about 6% of malignant diseases in childhood and adolescence; the most common soft tissue sarcoma in children and adolescents is rhabdomyosarcoma.
surgery	surgical intervention on or in the body of a patient for the purpose of treatment, less often also in the context of diagnostics; the surgical intervention is carried out with the help of special instruments, generally with the patient under anesthesia.
symptom	sign of illness
tumour	groups of abnormal cells forming a growing lump, both benign and malignant

ultrasound	an imaging technique used to examine organs, in which ultrasound waves are sent through the skin into the body; at tissue and organ boundaries, the sound waves are reflected back, picked up by a receiver (transducer) and converted into corresponding images with the help of a computer.
virus	viruses are infectious particles that do not have their own metabolism and therefore depend on host cells for their reproduction, on which they often have a pathogenic effect.
X-rays	high-energy electromagnetic radiation, discovered by W. C. Röntgen in 1895; X-rays can partially penetrate matter, so that insights into the interior of the human body are possible, among other things. Since X-rays have an ionising effect (ionising rays), they can also change matter, e.g. damage cells and possibly cause cancer. In diagnostics, X-rays are used to examine certain parts of the body. Depending on the type of irradiated tissue, the radiation is intercepted (absorbed) to varying degrees and displayed on a film plate as a two-dimensional image. Since every X-ray examination is associated with a certain amount of radiation, particularly sensitive parts of the body (such as gonads) must be protected. In the context of X-ray therapy (e.g. radiotherapy), very high-energy X-rays are used to kill tumour cells.