A pilot study about culturing laryngeal tumor tissue organoids to facilitate new treatment strategies for laryngeal cancer in the future

Published: 23-04-2021
Last updated: 09-11-2024

Primary Objective: We want to further develop and evaluate our patients* specific ex vivo LC organoids in which at least 50% of the obtained tumor samples are viable and proliferating at week 2 and 6.Secondary Objective: We will analyse differences...

Ethical review	Approved WMO
Status	Recruiting
Health condition type	Miscellaneous and site unspecified neoplasms benign
Study type	Observational non invasive

Summary

ID

NL-OMON55128

Source
ToetsingOnline

Brief title
Organoids model in laryngeal cancer

Condition

- Miscellaneous and site unspecified neoplasms benign

Synonym
Laryngeal cancer, Laryngeal carcinoma

Research involving
Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen

Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Ex vivo, Larynxcancer, Pilot study

Outcome measures

Primary outcome

In ex vivo LC organoids: viable and proliferating organoids after at least 2 and 6 weeks in 50% of the samples.

To assess viability and to confirm the origin of each tumor specimen, the specimen will be evaluated by analysis of non-necrotic tumor tissue in hematoxylin-eosin stained tissue sections and by determining proliferation rate on day 0, week 2 and week 6, using organoid formation and growth rate and by using whole genome DNA sequencing (~30x coverage (~100 Gb)).

Secondary outcome

We will analyse differences in solidity of ex vivo LC organoids between primary and recurrent LC tissue by using a Chi-square test with SPSS.

Study description

Background summary

Despite intensive treatment, prognosis of laryngeal cancer (LC) remains poor. Five years overall survival is 60% and an accurate treatment is of paramount significance to improve overall survival. Most patients with LC will receive larynx preserving (chemo)radiation without knowing the sensitivity of the LC. Selecting LC with low (chemo)radiosensitivity could prevent unnecessary (chemo)radiation.
Organoids which are tumor-derived three-dimensional cancer stem cells that mimic in vivo tumor characteristics were explored and efficacy has been tested in our well-established collaboration with the UMCG departments of Biomedical Sciences of Cells & Systems/Radiation Oncology, Medical Oncology, Ear Nose

Throat/Head and Neck Surgery, Pathology and Maxillofacial Surgery. Recently, the optimized organoids culture methodology for squamous esophageal cancers resulted in the parallel development of a culture methodology for organoids of head and neck squamous cell which was shown to be successful in six out of fourteen tumors. In this study we would like to develop and evaluate the efficacy of a solid ex vivo LC tumor model (= LC organoids) of patient derived LC tumor material by whole genome DNA sequencing. With solid LC organoids we would be able to test the effects of standard (chemo)radiation on self-renewal and regrowth potential of the LC stem cell derived organoids in future. Solid organoids predicting the patients (chemo)radiation response could lead to an improvement of LC treatment, by allowing selection of patients who will benefit from surgical treatment bypassing (chemo)radiation and as such improving survival and reducing side effects thereby increasing post-treatment quality of life.
With this pilot study, based on the methods described by Tanaka and Nagle (7, 8), we aim:
- to develop and evaluate solidity of patients* specific ex vivo LC organoids in which at least 50% of the obtained tumor samples are viable and proliferating at week 2 and 6
- to analyse difference of solidity of ex vivo model in primary and recurrent LC tissue
The findings of this pilot project will guide the design of early phase clinical trials in LC patients with the ultimate goal to develop less toxic and more effective treatment strategies.

Study objective

Primary Objective: We want to further develop and evaluate our patients* specific ex vivo LC organoids in which at least 50% of the obtained tumor samples are viable and proliferating at week 2 and 6.

Secondary Objective: We will analyse differences in solidity of ex vivo LC organoids between primary and recurrent LC tissue.

Study design

In this prospective study, fresh LC tissue will be collected to test feasibility of the patients specific ex vivo LC organoids.
Durations: Study period of 42 months
Setting: Biopsies will be taken at the departments of Otolaryngology / Head and Neck Surgery or Maxillofacial Surgery of the University Medical Center Groningen. During routine biopsy or during/after resection under general anaesthesia, three to five additional biopsies of the tumor (maximum 0.5 cm3) will be removed by using an endoscope. The subjects will not undergo extra procedures in the course of the research: only routinely procedures are performed (i.e. endoscopic examination in the outpatient clinic or under

general anaesthesia for tumor staging, resection of tumor by neck dissection, total laryngectomy). Also, 2ml blood will be withdrawn for DNA sequencing. Organoids of the ex vivo model will be developed and tested in the Laboratory of Medical Oncology and Laboratory of Cell Biology / Radiation Oncology, University Medical Center Groningen.

For the reliable translational use of these organoids we need to confirm their origin, define their genomic alterations and test genomic (in)stability over time. Therefore, we will analyze the original tumor and its organoids derivative after 2 weeks and after 6 weeks of culturing by whole genome DNA sequencing (~30x coverage (~100 Gb)). The 6 weeks period has been chosen because of the clinical translation of this model: organoids based treatment strategies can only be tested during a maximum of six weeks staging period between tissue biopsy and start of treatment. After collection of the original tumor specimen for organoids culturing we will store part of this tumor tissue for DNA-analysis at -20 degree Celsius. The other part will be used for organoids culturing. After a maximum of three months culturing, the organoid will be destroyed.

We will analyse differences in solidity of ex vivo LC organoids between primary and recurrent LC tissue by using a Chi-square test with SPSS.

Study burden and risks

We expect no significant additional burden or risks associated with participation. During routine biopsy or during/after resection under general anaesthesia, three to five additional biopsies of the tumor (maximum 0.5 cm3) will be removed by using an endoscope.

Contacts

Public
Universitair Medisch Centrum Groningen

Hanzeplein 1
Groningen 9713 GZ
NL
Scientific
Universitair Medisch Centrum Groningen

Hanzeplein 1
Groningen 9713 GZ
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

- proven carcinoma of the larynx.
- > 18 yrs of age
- planned routine biopsy or planned surgical resection as part of standard diagnostic work-up or treatment
- expected tumor volume > 2 cm3
- informed consent

Exclusion criteria

- no squamous cell carcinoma after definitive histolopathological analysis

Study design

Design

Study type: Observational non invasive

Masking:	Open (masking not used)
Control:	Uncontrolled
Primary purpose:	Other

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	10-10-2022
Enrollment:	20
Type:	Actual

Ethics review

Approved WMO Date:	23-04-2021
Application type:	First submission
Review commission:	METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL73814.042.20