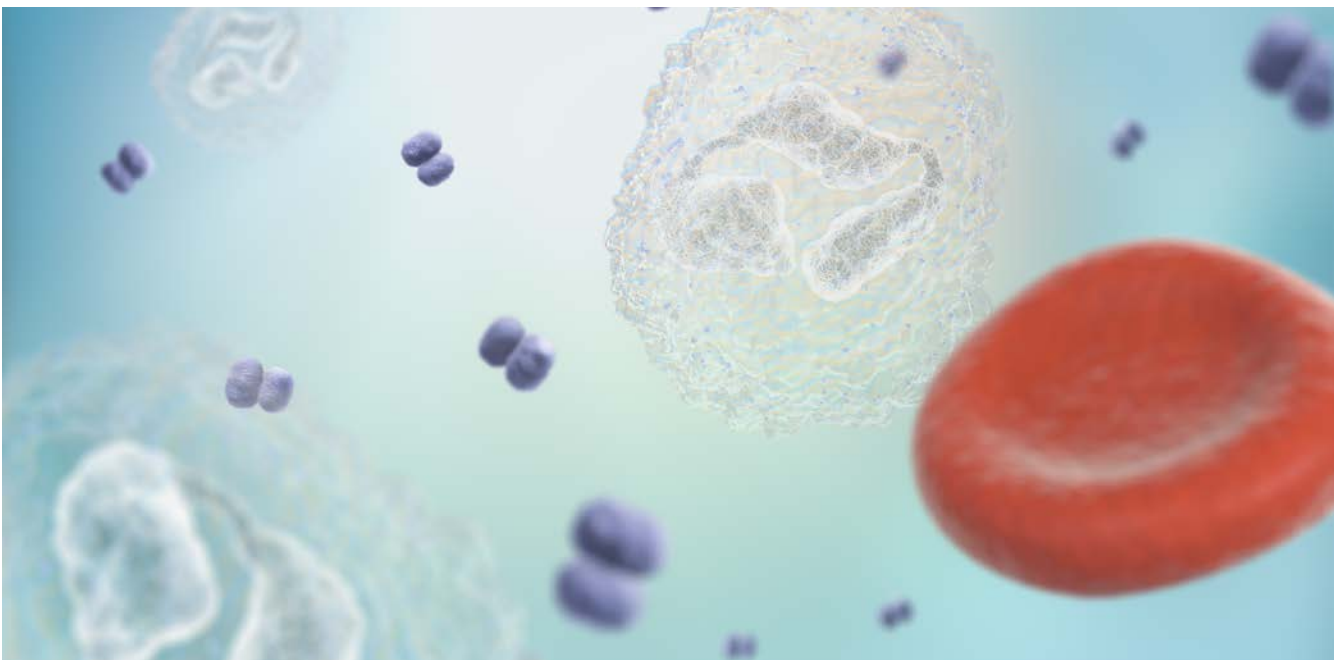


CASE REPORT

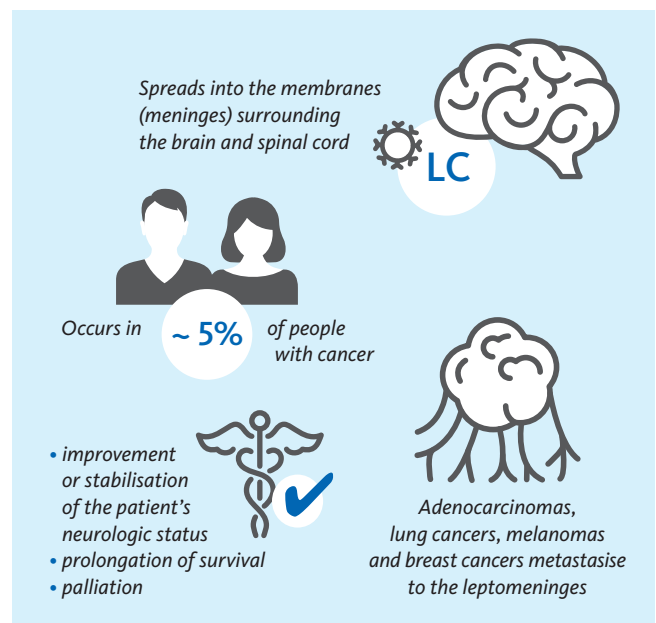
Leukaemias/malignancies

CSF analysis from a breast cancer patient



Leptomeningeal carcinomatosis (LC)

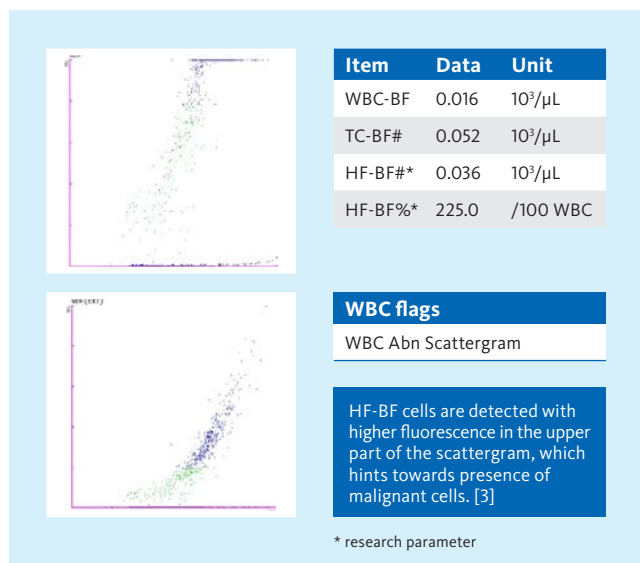
- LC is a rare and severe complication of cancer in which the disease spreads into the membranes (meninges) surrounding the brain and spinal cord.
- LC occurs in approx. 5% of people with cancer. Overall, current treatment offers poor outcome. If left untreated, median survival is 4 – 6 weeks; if treated, median survival is 3 – 6 months [1].
- Most common tumours to metastasise to the leptomeninges are adenocarcinomas, lung cancers, melanomas and breast cancers [2]. Because of the different relative frequencies, most patients with LC have breast cancer.
- Treatment goals include improvement or stabilisation of the patient's neurologic status, prolongation of survival and palliation. Standard therapies include intra-cerebrospinal fluid (CSF) chemotherapy and involved field radiation for bulky disease [1].



Clinical outcomes

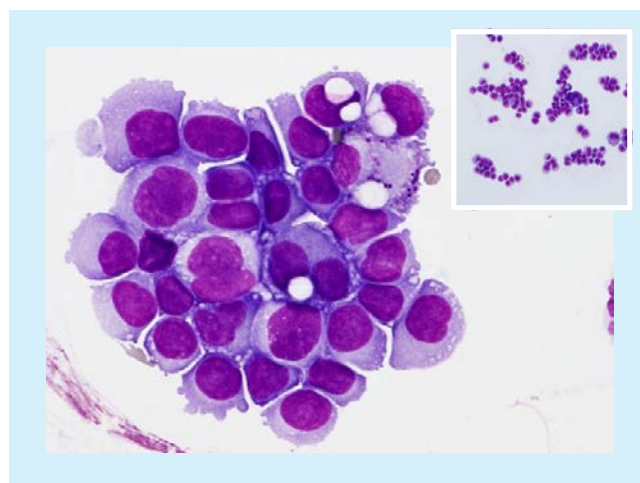
This patient case is about a female patient known to have breast cancer and hydrocephalus.

- The patient underwent adenocarcinoma resection.
- A craniotomy took place two weeks prior to the lumbar puncture.
- The white blood cell count (WBC-BF) and the total nucleated cell count (TC-BF) were elevated.
- Moreover, the analysis of the CSF in the Body Fluid mode of an XN-Series analyser revealed the presence of high fluorescence cells (HF-BF).
- Due to the presence of HF-BF the flag ‘WBC Abn Scattergram’ was triggered.
- A cytospin was prepared and the digital imaging analysis of the sample showed malignant epithelial tumour cells in the CSF.
- The patient was consequently diagnosed with leptomeningeal carcinomatosis.
- Karnofsky score < 60 (see table below)



Digital imaging analysis of the patient’s cytospin

The cytospin is rich in cells which are malignant epithelial tumour cells. They have polymorphic hyper-chromic nuclei and sometimes there are double-nuclei present. Some cells have vacuolated cytoplasm, sometimes with magenta bodies.



Karnofsky performance scale

- The Karnofsky performance scale (KPS) allows patients (≥ 16 years of age) to be classified according to their functional impairment.
- The functional status of a patient is assessed on an 11-point scale ranging from full well-being (100%) to death (0%), decreasing ten points at each level [4].

General category	%	Specific criteria
Able to carry on normal activity	100	Normal general status – No evidence of disease
No special care needed	90	Able to carry on normal activity – Minor sign of symptoms of disease
	80	Normal activity with effort, some signs or symptoms of disease
Unable to work	70	Able to care for self, unable to carry on normal activity or do work
Able to live at home and care for most personal needs	60	Requires occasional assistance from others, frequent medical care
Various amount of assistance needed	50	Requires considerable assistance from others, frequent medical care
Unable to care for self	40	Disabled, requires special care and assistance
Requires institutional or hospital care or equivalent	30	Severely disabled, hospitalisation indicated, death not imminent
Disease may be rapidly progressing	20	Very sick, hospitalisation necessary, active supportive treatment necessary
Terminal states	10	Moribund
	0	Dead

References

- [1] **Kwon JW et al. (2021):** Cerebrospinal Fluid Profiles and Their Changes after Intraventricular Chemotherapy as Prognostic or Predictive Markers for Patients with Leptomeningeal Carcinomatosis. *J Korean Neurosurg Soc.* Jul;64(4): 631–643.
- [2] **Bruna J et al. (2009):** Leptomeningeal carcinomatosis. Prognostic implications of clinical and cerebrospinal fluid features. *Cancer Jan 15;115(2):* 381–389.
- [3] **Labaere D et al. (2015):** Detection of malignant cells in serous body fluids by counting high-fluorescent cells on the Sysmex XN-2000 hematology analyzer. *Int J Lab Hematol;* 37(5): 7153722.
- [4] **www.emedicine.medscape.com** assessed 31.08.2021.