CARE PATHWAY STANDARD FOR STROKE PATIENTS

Process guide for the management of patients with ischaemic stroke

BEFORE HOSPITALISATION

- ✓ The Emergency Response Centre records the patient's medical history and issues an ambulance dispatch order.
- ✓ The ambulance takes note of the medical history and carries out an objective examination[1].
- ✓ **The patient with stroke symptoms is transported to the nearest hospital for thrombolysis**.
- ✓ The ambulance informs the **on-call neurologist and/or the on-duty doctor in the emergency department** of the arrival of the patient in advance.

ACUTE TREATMENT

On arrival in the emergency department with suspected ischaemic stroke

If ischaemic stroke is suspected, the patient is admitted to the emergency department **to perform an immediate objective assessment**:

- ✓ To assess neurological status and deficits, the neurologist performs an objective examination, which includes the NIHSS scale.
- ✓ The patient's medication and concomitant diseases are reviewed to make an initial treatment decision.
- ✓ The neurologist assesses the patient's pre-hospital functional status using the modified Rankin scale.
- ✓ Analyses and studies are carried out (ANNEX 1).

As per hospital protocol, a revascularisation treatment is carried out in the absence of contraindications.

The patient is hospitalised in the stroke unit[2] or in the intensive care unit if necessary, according to their clinical condition. Hospitalisation marks the beginning of a stroke patient's care pathway.

At the stroke unit

At the stroke unit, patients are treated by a multidisciplinary team[3].

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[1] Ambulance work instructions. Second, revised edition. Estonian Health Insurance Fund. 2021.

[2] Hospital with a stroke unit means a healthcare facility, as defined by the standard of the European Stroke Organisation , where a stroke patient is treated by a multidisciplinary team and where revascularisation treatment is available. In Estonia, stroke units are located at the North Estonia Medical Centre, Tartu University Hospital, West Tallinn Central Hospital, East Tallinn Central Hospital, Pärnu Hospital, and Ida-Viru Central Hospital.

[3] SAP-E ESSENTIALS OF STROKE CARE. An overview of evidence-based interventions covering the entire chain of stroke care. European Stroke Organisation, Stroke Alliance for Europe. 2021.

Assessments and studies

- ✓ **A swallowing assessment** using a recognised scale[4] (e.g. GUSS) is performed on patient arrival or at least before administering oral food, fluids, or medication.
- ✓ In cases where a patient has swallowing disorders that may require therapeutic feeding, **decisions on feeding should be made by a specialist competent in clinical nutrition therapy** (a registered doctor, nurse, speech therapist, registered dietitian whose competence has been assessed in accordance with the EstSPEN procedure), documenting the decision and following the clinical nutrition quality criteria.

At the discretion of the attending physician, **an initial physiotherapeutic assessment and a speech and communication assessment by a speech therapist will take place within 48 hours**. Patients who have undergone **thrombolysis or thrombectomy** will be assessed using the **NIHSS** scale **24 hours after the start of the treatment**.

- ✓ **In order to clarify the aetiology of the stroke, advanced diagnostic tests** will be carried out in accordance with the decision of the attending physician.
  - ✓ **Advanced diagnostic tests** (ANNEX 2) **and blood tests** are done to assess the aetiology of the stroke (ANNEX 3).
  - ✓ If no contraindications are present, an examination of the arteries supplying blood to the brain is performed within 48 hours of the onset of the **ischaemic stroke** symptoms.
- ✓ **The attending physician will consult with the vascular surgeon about the need, possibility, and timing of the surgery, following an examination of the arteries supplying blood to the brain, at the earliest opportunity.** Carotid endarterectomy or stenting should be performed within 14 days of stroke, unless contraindicated.
- ✓ **At the end of the acute care period, the neurologist assesses the patient's functional status using the modified Rankin scale. The neurologist also assesses the severity of the patient's neurological deficit using the NIHSS scale**. Based on the nature of functional impairments, their severity, and overall condition, the treatment team decides on the need for rehabilitation and further treatment.
- ✓ **Secondary prevention activities are started.**

Nurse's activities in the stroke unit

The nurse will follow the hospital's protocol for the monitoring of stroke patients, which includes the following activities:

- ✓ Initial swallowing assessment when the patient is admitted.
- ✓ Blood glucose monitoring during the first 48 hours. In diabetic patients, blood glucose should be measured at mealtimes or more frequently; in other patients, at mealtimes. If blood glucose > 10 mmol/l, insulin should be administered according to clinical guidelines.
- ✓ Body temperature should be measured every 6 hours or more often. If the body temperature is > 37.5 °C, administer the medicine according to the instructions of the attending physician.
- ✓ Blood pressure should be measured every 3 hours or more often. If the patient's blood pressure exceeds the clinical threshold, administer the antihypertensive medication as directed by the attending physician or based on the limits agreed upon within the unit.

[4] National Institute for Health and Care Excellence (NICE) Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition. nice.org.uk/guidance/cg32, 2013

- ✓ If the patient's general clinical condition permits movement, it is important to assist them in getting out of bed, standing, or walking, if necessary, already within the first 24 hours. The activity is authorised by the attending physician.
- ✓ Measurement of post-void residual urine (ultrasound if possible); voiding the bladder if necessary to prevent urinary tract infections by single catheterisation.
- ✓ Use the ABCDEF prediction system for the prevention of delirium in high-risk patients[5].
- ✓ Fall prevention will be implemented according to standard practice. Patient's risk of falling is assessed using the MORSE scale within the first 24 h.
- ✓ For bedridden patients, the risk of pressure ulcers is assessed using the Braden scale.

Secondary prevention

In order to prevent cardiovascular complications and recurrent stroke, it is necessary to start secondary prevention in the stroke unit during the acute phase of treatment. Medication and lifestyle counselling is provided by the stroke nurse and/or the attending physician, including setting secondary prevention goals.

Patient counselling

The social worker counsels the patient and their family members while the patient is still hospitalised. The social worker advises on the services and support that the state, local government, or private organisations can offer and also provides support and guidance in applying for documentation from different agencies and in finding and accessing appropriate support services.

If the stroke nurse or the attending physician has defined a need on the basis of the criteria (list described in the next paragraph), the patient or their relatives will be contacted during the hospitalisation period by a **stroke coordinator**, who will help to plan a smooth transition to complementary services (finding the necessary providers, booking appointments) or transfer to home, and who remains the patient's primary point of contact with the care team for post-hospital assessment of needs, coordination of services, and the provision of care pathway support information and motivational support.

The stroke coordinator service is provided to patients who have at least one of the following circumstances that complicate their condition and/or recovery:

- several concomitant diseases;
- weak support network;
- memory and mood problems;
- a history of poor adherence to treatment.

[5] Guidelines for intensive care nurses for the prevention of post-intensive care syndrome in adult patients. Reta Loodus, Tallinn Health Care College, 2023

LEAVING THE STROKE UNIT

Discharge from hospital should be planned with the patient and their family members where possible to ensure that the parties are informed of the assistance needed. **When a patient leaves the stroke unit:**

- ✓ **The attending physician or stroke nurse has given the patient and/or their relatives an overview of the patient's state of health and the treatment given, and explained the further treatment arrangements.** In case of clinical need, the attending physician will arrange a referral for follow-up care, inpatient nursing care, or inpatient/outpatient rehabilitation (including daily physiotherapy and occupational therapy).
- ✓ If the patient's physical and cognitive condition allows it, **a secondary prevention follow-up appointment is planned with a stroke nurse,** including a referral letter from the attending physician and an appointment booked by the stroke nurse or ward nurse. The medical team will also pass on the information about the appointment to the stroke coordinator if the patient needs this service. Patients should see a stroke nurse around 90 days after the onset of stroke.
- ✓ Follow-up by a neurologist is planned if treatment and aetiology need to be further clarified.
- ✓ The patient will be instructed to contact the family physician and book a follow-up visit 30 days after the end of the hospital stay.
    - For patients using the stroke coordinator service, the stroke coordinator will inform the patient's family physician by phone and book an appointment for the patient, which will take place within 30 days of the patient's return home. If necessary, the stroke coordinator helps to plan the use of additional services, e.g. finding appointment times for services prescribed under the treatment plan, organising transportation with the help of the local government, etc.

Follow-up or inpatient nursing care

If the patient has moderate/severe functional impairment and is not capable of intensive or functional rehabilitation, the patient will be referred to either follow-up care and/or an inpatient nursing care based on a referral.

Patients in a stable general condition who require daily medical supervision at least once a day and/or nursing care are referred to **follow-up treatment**. Patients referred to follow-up treatment have a medication and intervention plan drawn up by the attending physician in the acute care unit. The plan is adapted as necessary to the patient's changing condition. Depending on the clinical condition, the interventions may include physiotherapy, speech and/or swallowing therapy, and/or occupational therapy. The goal of follow-up treatment is to support the patient's recovery from both the underlying condition and concomitant disease(s), enabling them to return to their pre-hospital life, progress to the next stage of care (e.g. rehabilitation, nursing), or alleviate symptoms.

Inpatient nursing care is provided for patients in stable general condition, with various complications, profound cognitive impairment, low physical capacity (unable to participate in 3 hours of rehabilitation activities in one day) and with a need for round-the-clock nursing care. The treatment process is managed by a nurse.

Depending on the patient's capacity, the physician of the acute care unit will make a recommendation for functional therapy and its intensity and/or frequency (e.g. involvement in self-care activities, activation, physiotherapy, occupational therapy, activity coaching) in the treatment plan.

At the end of the need for follow-up or inpatient nursing care, the patient's need and suitability for rehabilitation is assessed in accordance with the assessment procedures agreed by the institution. If necessary, the unit's consulting physician will make a referral to a rehabilitation physician in an inpatient or outpatient rehabilitation unit, describing the patient's condition.

In cases where the rehabilitation physician considers that rehabilitation is indicated, the patient will be referred to a rehabilitation service on the basis of a referral letter.

Inpatient rehabilitation

If the patient has moderate/severe functional impairment and is capable of intensive or functional rehabilitation, the patient is referred to inpatient rehabilitation[6]. Treatment is initiated either immediately after discharge from the acute care unit, after follow-up care, or after discharge from the inpatient nursing unit if the patient's condition already allows for more intensive rehabilitation in a specialised unit.

The **rehabilitation specialist** assesses the patient's general health and functional impairments and selects the rehabilitation treatment and therapies appropriate for the specific impairments of the patient. The treatment team is involved in preparing the treatment plan, which includes a physiotherapist, occupational therapist, speech therapist, clinical psychologist, social worker, and nursing staff, as needed. The treatment plan must describe the goals of the treatment, i.e. what the patient could achieve in terms of functional capacity for each impairment.

The patient must be provided with treatment (therapies appropriate for their functional impairments) at least 5 days a week and at least 3 hours a day[6]. The duration of one treatment period of inpatient rehabilitation, depending on the severity of the functional impairment, is 14–21 days on average; depending on the assessment carried out at the end of the rehabilitation period, it is possible to extend the rehabilitation period.

During inpatient rehabilitation, the treatment team may decide to extend the treatment period. The decision to continue rehabilitation is made after 2–3 weeks of treatment. Treatment is continued if the patient's functional independence assessment shows positive dynamics and the prognosis for continued functional improvement is favourable. Treatment is discontinued if there is no objectively measurable improvement in functional capacity.

Treatment decisions are formulated using the assessment instruments FIM or FIM+FAM. At the end of the inpatient rehabilitation period, the further treatment plan will be designed according to the decision of the rehabilitation team set out in the medical record.

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Outpatient rehabilitation

If the patient has **severe functional impairment or a single functional impairment (speech, manual activity, etc.)** and the rehabilitation requires the services of one or two specialists and the patient is able to be treated, the patient is referred to **outpatient rehabilitation**[7]. The stroke coordinator will help the patient to book an appointment with a rehabilitation therapist or independent physiotherapist/speech therapist/clinical psychologist at a rehabilitation facility as close to home as possible. For patients who are not prescribed or who have not agreed to the coordinator service, referrals to rehabilitation facilities will be provided by another member of the treatment team. A letter of referral from the attending physician is required.

The recommended time to access the service is within 7 days. The patient must be ensured access to prescribed therapies – occupational, speech, psychological, and/or physiotherapy – in the volume and frequency specified by the treating physician.

If the patient **needs complex rehabilitation** but does not require round-the-clock nursing care, the patient can be referred to a **day care rehabilitation unit** according to the indications. The patient must be provided with the prescribed therapies, in the volume and frequency determined by the attending physician, in accordance with the conditions for implementing outpatient treatment.

If the necessary transportation is unavailable, the stroke coordinator will assist patients using the stroke coordinator service in arranging local authority transport to the treatment facility.

The patient needs **home rehabilitation (physiotherapy and/or occupational therapy)** if:

- the patient has a severe movement and postural dysfunction, but does not require intensive treatment in a rehabilitation unit;
- there is a need to continue rehabilitation after the end of inpatient treatment or if the patient can engage only in home care, including engage in independent rehabilitation;
- the patient has been indicated for physiotherapy and/or occupational therapy but is prevented from reaching the rehabilitation facility because of a significant mobility problem.

The possibilities to provide rehabilitation in the everyday environment are determined according to internal working arrangements (possibility of home visits by physiotherapists, etc.).

HOME TREATMENT / UNDER FAMILY PHYSICIAN AND NURSE SUPERVISION

If the patient does not need rehabilitation or if rehabilitation is not indicated, the patient will go home and remain under the care of the **family physician and nurse**. A visit to the family physician should take place **30 days after returning home**.

The family physician will advise on changes in living arrangements and monitor the patient's state of health in accordance with the principles of secondary prevention of stroke and the patient's personal goals. If the patient cannot manage independently at home due to their health, functional capacity, or living environment, **the family physician or nurse will refer them to the local government to arrange**

[7] Post-stroke rehabilitation. RJ-I/37.1-2019. Ravijuhendite nõukoda (Advisory Board on Treatment Guidelines). 2019.

24-hour general care services at home. For patients using the stroke coordinator service, the stroke coordinator assists in finding information about securing a place in general care services.

THIRD-MONTH INTERIM ASSESSMENT AND FURTHER FOLLOW-UP AS PART OF THE CARE PATHWAY

Three months after the end of hospital treatment, a stroke nurse's appointment takes place, during which the stroke nurse assesses the patient's post-stroke recovery using the simplified modified Rankin scale, assesses the decline in functionality, possible development of new symptoms, etc. If it becomes apparent that the patient may need rehabilitation (if it has not been done before or needs to be continued), the stroke nurse will refer the patient to a rehabilitation nurse and issue a referral letter. The stroke nurse monitors the achievement of secondary prevention goals (including personal goals) and assesses the patient's compliance with treatment.

Further monitoring and assessment of the patient will be carried out by the family physician for the remainder of the course of treatment, with at least one follow-up visit between 90 and 365 days after the end of the hospital stay. The family physician or nurse assesses the patient's compliance with treatment and secondary prevention targets and checks prescriptions and whether medications have been dispensed.

ANNEXES

ANNEX 1.

Blood tests: at least APTT, INR, electrolytes, creatinine/eGFR, haemogram, glucose, CRV.
Electrocardiogram (ECG)
CT and/or MRT

ANNEX 2.

Transthoracic echocardiography
Oesophageal echocardiography
Daily ECG Holter monitoring
ECG telemetry
Imaging of the head and neck arteries

ANNEX 3.

Blood tests: HbA1c, Chol, HDL, LDL