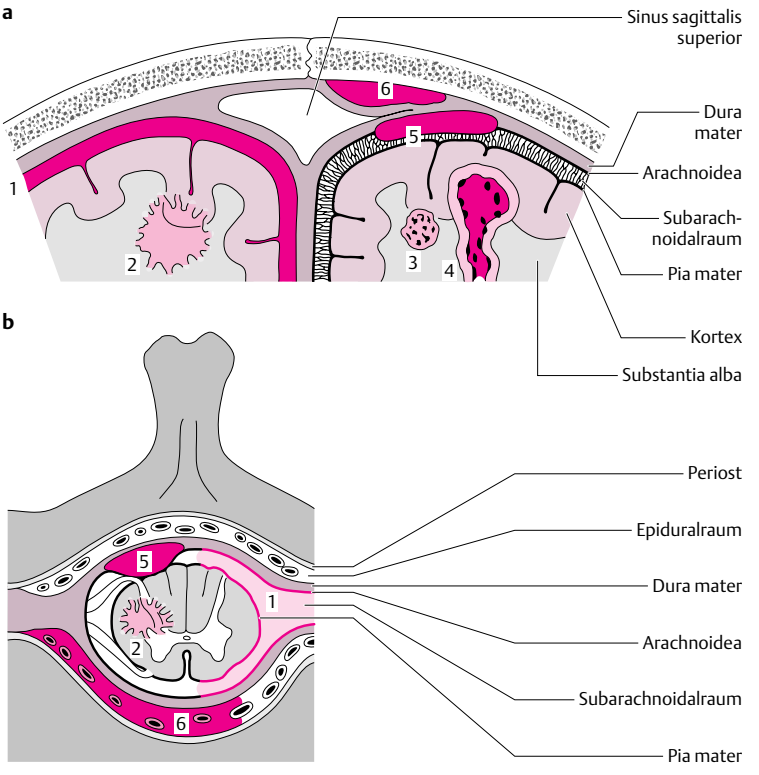

Rückenmark:

1 = Arachnoiditis
2 = Myelitis

5 = spinaler Subduralabszess
6 = spinaler Epiduralabszess

Gehirn:

1 = Meningitis
2 = Enzephalitis
3 = Zerebritis (= Frühstadium) } Hirnabszesse
4 = Abszess (= Spätstadium) }
5 = subdurales Empyem
6 = Epiduralabszess

Fig. 2.**13a, b** **Localization and nomenclature of intracranial and spinal infections.**
a Intracranial infections.
b Spinal infections.

Ancillary Tests in the Evaluation of Suspected CNS Infection

■ Cerebrospinal Fluid Examination (308)

Definition:
The cerebrospinal fluid is examined for the diagnosis or exclusion of infectious or demyelinating diseases of the brain, meninges, spinal cord, and nerve roots, of subarachnoid hemorrhage, and of carcinomatous or sarcomatous meningitis. A sample of cerebrospinal fluid can be obtained by lumbar puncture or, in exceptional cases, by suboccipital puncture.

Indications

The indications for cerebrospinal fluid examination should be liberal, as imaging studies may fail to detect acute bacterial meningitis and "CT-negative" subarachnoid hemorrhage.

Contraindications

The following are *absolute contraindications* to lumbar and suboccipital puncture:
- clinical evidence of intracranial hypertension;
- platelet count under 5,000.

The following are *relative contraindications:*
- anticoagulation;
- platelet count 5,000–20,000;
- lumbar paraspinal abscess or other infection.

The *risks* of lumbar puncture are:
- transtentorial or transforaminal herniation, if the intracranial pressure is dangerously elevated;
- clinical worsening of paraparesis, if there is a partial block to the flow of cerebrospinal fluid;
- epidural, subdural, and subarachnoid hemorrhage.

The risk of bleeding after lumbar puncture in patients with normal coagulation status is less than 1%.

■ Lumbar Puncture

The most important consideration for a successful lumbar puncture is the positioning of the patient (Fig. 2.**14**). The head should be at the same level as the puncture site. The shoulders should be vertically superimposed so that there is no torsion of the spine. If the patient is agitated or uncooperative, one or more assistants can hold the patient's head and knees from the front.

Orientation is facilitated by the line connecting the two posterior superior iliac spines, which usually intersects the spinous process of L4. The puncture may be one segment higher or one or two segments lower.

The physician wears sterile gloves. The skin is prepared with disinfectant and local anesthesia is injected at the intended puncture site. It is important to wait 1–2 minutes for this to take effect. The puncture is performed with an 8–10-cm long spinal needle with stylet, strictly in the midline and aiming approximately 30 degrees upward, through the tough interspinous ligament. If bony resistance is felt, the needle should be partially withdrawn and reintroduced in another direction, usually more cranial than before. Penetration of the ligamentum flavum is felt as a brief "pop" as the resistance to passage of