

Lumbar puncture

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A lumbar [puncture](#) (or [LP](#), and colloquially known as a [spinal tap](#)) is a diagnostic and at times therapeutic medical [procedure](#).

[Lumbar puncture](#) was first introduced in [1891](#) by the German physician [Heinrich Quincke](#).

He published his findings in the German medical journal "Deutsche Medizinische Wochenschrift" describing the technique and the diagnostic uses of the cerebrospinal fluid obtained by the procedure.

He reported the first cases of [idiopathic intracranial hypertension](#) (IIH) shortly after he introduced the [lumbar puncture](#) into medicine.

<html><iframe width="560" height="315" src="https://www.youtube.com/embed/7tcrSd5lLoc" title="YouTube video player" frameborder="0" allow="accelerometer; autoplay; clipboard-write; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe></html>

Indications

[Lumbar puncture indications](#).

Technique

[Lumbar puncture technique](#)

Complications

[Lumbar puncture complications.](#)

Contraindications

Well-known contraindications to lumbar puncture are an [intracranial tumor](#), [obstructive hydrocephalus](#), [coagulopathy](#), and [ruptured aneurysm](#) with [subarachnoid hemorrhage](#).

Case series

Danish nationwide, population-based cohort study using medical registries to identify persons who underwent lumbar puncture and had cerebrospinal fluid analysis (January 1, 2008-December 31, 2018; followed up through October 30, 2019). Coagulopathy was defined as platelets lower than $150 \times 10^9/L$, international normalized ratio (INR) greater than 1.4, or activated partial thromboplastin time (APTT) longer than 39 seconds.

Exposures: Coagulopathy at the time of lumbar puncture.

Main outcomes and measures: Thirty-day risk of spinal hematoma. Risks were provided as numbers and percentages with 95% CIs. Secondary analyses included risks of traumatic lumbar puncture ($>300 \times 10^6$ erythrocytes/L after excluding patients diagnosed with subarachnoid hemorrhage). Adjusted hazard rate ratios (HRs) were computed using Cox regression models.

Results: A total of 83 711 individual lumbar punctures were identified among 64 730 persons (51% female; median age, 43 years [interquartile range, 22-62 years]) at the time of the procedure. Thrombocytopenia was present in 7875 patients (9%), high INR levels in 1393 (2%), and prolonged APTT in 2604 (3%). Follow-up was complete for more than 99% of the study participants. Overall, spinal hematoma occurred within 30 days for 99 of 49 526 patients (0.20%; 95% CI, 0.16%-0.24%) without coagulopathy vs 24 of 10 371 patients (0.23%; 95% CI, 0.15%-0.34%) with coagulopathy. Independent risk factors for spinal hematoma were male sex (adjusted hazard ratio [HR], 1.72; 95% CI, 1.15-2.56), those aged 41 through 60 years (adjusted HR, 1.96; 95% CI, 1.01-3.81) and those aged 61 through 80 years (adjusted HR, 2.20; 95% CI, 1.12-4.33). Risks did not increase significantly according to overall severity of coagulopathy, in subgroup analyses of severity of coagulopathy by pediatric specialty or medical indication (infection, neurological condition, and hematological malignancy), nor by cumulative number of procedures. Traumatic lumbar punctures occurred more frequently among patients with INR levels of 1.5 to 2.0 (36.8%; 95% CI, 33.3%-40.4%), 2.1 to 2.5 (43.7%; 95% CI, 35.8%-51.8%), and 2.6 to 3.0 (41.9% 95% CI 30.5-53.9) vs those with normal INR (28.2%; 95% CI, 27.7%-28.75%). Traumatic spinal tap occurred more often in patients with an APTT of 40 to 60 seconds (26.3%; 95% CI, 24.2%-28.5%) vs those with normal APTT (21.3%; 95% CI, 20.6%-21.9%) yielding a risk difference of 5.1% (95% CI, 2.9%-7.2%).

In this Danish [cohort](#) study, risk of [spinal hematoma](#) following [lumbar puncture](#) was 0.20% among patients without coagulopathy and 0.23% among those with coagulopathy. Although these findings may inform decision-making about lumbar puncture by describing rates in this sample, the observed rates may reflect bias due to physicians selecting relatively low-risk patients for lumbar puncture ¹⁾.

¹⁾

Bodilsen J, Mariager T, Vestergaard HH, Christiansen MH, Kunwald M, Lüttichau HR, Kristensen BT, Bjarkam CR, Nielsen H. Association of Lumbar Puncture With Spinal Hematoma in Patients With and

Without Coagulopathy. JAMA. 2020 Oct 13;324(14):1419-1428. doi: 10.1001/jama.2020.14895. PMID: 33048155.

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