Plexiform Neurofibroma Prognosis

- Clinical Efficacy of Selumetinib in Alleviating Neuropathic Pain Associated with Plexiform Neurofibroma: A Case Series
- Efficacy and safety of selumetinib in adults with neurofibromatosis type 1 and symptomatic, inoperable plexiform neurofibromas (KOMET): a multicentre, international, randomised, placebo-controlled, parallel, double-blind, phase 3 study
- Treatment of Plexiform Neurofibromas : Current Perspectives on Surgery and Medical Treatment
- Ocular Safety and Visual Acuity Stability in Pediatric Patients With Optic Pathway Gliomas and Orbital Plexiform Neurofibromas Treated With BRAF and MEK Inhibitors
- Malignant Peripheral Nerve Sheath Tumor (MPNST) Arising from Orbital Plexiform Neurofibroma in a Small Child With Neurofibromatosis Type 1
- Loss of NF1 Accelerates Uveal and Intradermal Melanoma Tumorigenesis, and Oncogenic GNAQ Transforms Schwann Cells
- Selumetinib in adults with NF1 and inoperable plexiform neurofibroma: a phase 2 trial
- Case Report: Surgical Decompression With Subsequent Selumetinib Treatment Leads to Drastic Clinical Improvement in a Patient With a Large Spinal Plexiform Neurofibroma

General Prognosis

- Benign but potentially progressive tumor.
- Commonly associated with **Neurofibromatosis Type 1 (NF1)**.
- Growth behavior is unpredictable: some remain stable, others grow rapidly — especially during childhood and puberty.
- Can be disfiguring and cause functional impairment depending on location and size.

⚠ Risk of Malignant Transformation

- Lifetime risk of transformation into **Malignant Peripheral Nerve Sheath Tumor (MPNST)**: **5–15%**.
- Independent risk factors for malignancy:
  - Involvement of cranial nerve ganglia
  - Rapid increase in tumor size
  - New onset of pain or neurologic deficit
  - Deep or visceral tumor location (e.g., paraspinal, retroperitoneal)

Prognostic Factors

Factor	Impact on Prognosis
Age of onset	Earlier onset → longer exposure, higher cumulative risk
Tumor size and depth	Larger or deep-seated tumors → worse prognosis
NF1 status	Associated with greater tumor burden and risk
Surgical resectability	Incomplete resection → frequent recurrence
MRI findings	Heterogeneity, necrosis, or loss of “target sign” may suggest aggressive behavior

Neurological and Functional Impact

- Tumors may compress or infiltrate nerves, leading to:
  - Sensory or motor deficits
  - Pain or neuropathic symptoms
  - Disfigurement (especially in head and neck PNFs)
  - Loss of function (e.g., brachial plexus, spine involvement)

Summary

> Plexiform neurofibromas are benign tumors with variable clinical behavior. Prognosis depends on tumor location, growth rate, NF1 association, and the risk of malignant transformation. Lifelong follow-up and individualized management are essential.

Tonsgard et al. examined the incidence and radiologic characteristics of plexiform neurofibromas in neurofibromatosis-1 (NF-1) to define a cohort at greatest risk for malignant nerve-sheath tumors.

Plexiform neurofibromas are a frequent complication of NF-1. They can impair function, produce disfigurement, and be the site for the development of malignant nerve-sheath tumors. The incidence and natural history of plexiform neurofibromas is unknown.

CT imaging of the chest, abdomen, and pelvis was performed in 91 of 125 consecutive adults (age, > or = 16 years) with NF-1.

Twenty percent of patients had plexiform neurofibromas of the chest in the paraspinal, mediastinal, or supraclavicular area. Approximately 40% of patients had abnormal abdominal/pelvic scans. The paraspinal, sacral plexus, sciatic notch, and perirectal regions were the most common sites. Most plexiform neurofibromas were asymptomatic. Imaging also revealed a number of tumors, including malignant nerve-sheath tumors, adrenal tumors, carcinoids, and schwannomas.

The frequency of plexiform lesions and other tumors in NF-1 indicates that clinicians should monitor young adults carefully; however, imaging characteristics alone cannot reliably distinguish benign from malignant lesions [1].

Cervical cord compression from cervical root neurofibromas represents an important clinical problem in patients with neurofibromatosis type 1 (NF1), but is rarely reported. The aim of this study was to describe the clinical presentation and follow-up of children and adults with NF1 and cervical cord compression. A retrospective review of clinical records and neuroimaging studies from two large tertiary care centres between 1996 and 2006 was performed. 13 patients with NF1 and cervical cord compression were identified. Age at presentation ranged from 9 to 61 years. The most common presentation was progressive quadriparesis. 11 of 13 patients underwent cervical decompression and subtotal resection of the associated neurofibroma. The majority of patients had recovery of neurological function and no further clinical progression. Progressive neurological deficit (typically quadriparesis), rather than neuroimaging appearances, should dictate the need for surgery [2].

Retrospective cohort analysis

Involvement of Cranial Nerve Ganglion as an Independent Risk Factor for Malignant Transformation of Head and Neck Plexiform Neurofibromas in Neurofibromatosis Type 1

In a retrospective cohort analysis of patients undergoing surgical resection of head and neck plexiform neurofibromas (PNF) at a tertiary neuro-oncology center. Gu et al. from the Shanghai Ninth People's Hospital, Shanghai (Departments of Plastic & Reconstructive Surgery, Pathology, Neurosurgery) published in the Plastic and Reconstructive Surgery Journal to identify risk factors—particularly cranial nerve ganglion involvement—predicting malignant peripheral nerve sheath tumor (MPNST) transformation in head and neck PNF among NF1 patients.

Main conclusions: - Four percent (19/470) of clinically treated head & neck PNF became malignant. - Independent risk factor: involvement of cranial nerve ganglia (adjusted OR 3.10; 95% CI 1.07–9.00). - Ganglion–involved PNF transformed faster (HR 7.20; 95% CI 2.33–22.28), accelerating time to MPNST by ~36% [3)]

Critical review

□ Strengths: - Large, single-center cohort with surgery-confirmed diagnoses over 11 years (2012–2023). - Robust statistical methods (logistic + Cox regression) identify both risk magnitude and temporal acceleration. - Clinically actionable endpoint: close surveillance and earlier intervention for ganglion-involved PNF.

⚠ Limitations: - Retrospective design; possible selection bias—only surgically treated cases included. - PNF heterogeneity in size, volume, and precise anatomical pathways may influence results but lacked standardized imaging metrics. - External validity limited: single-center data from China; demographic & management differences may apply elsewhere.

□ Methodology critique: - Appropriate use of multivariable logistic regression; however, only a few covariates tested. Other confounders (e.g., NF1 genotype, prior radiotherapy, growth rate) omitted. - Cox model hazard ratio (7.20) is large but CI wide—suggests smaller sample or variable follow-up times.

□ Clinical takeaway for neurosurgeons: Evaluate head and neck PNF for cranial nerve ganglion involvement via imaging (MRI/CT); if present, patients should undergo intensified monitoring (e.g., 6-month imaging) and early biopsy or resection upon suspicious changes.

Final verdict: 7 / 10 A solid observational study that highlights a radiographically discernible risk factor with clinical implications. Would benefit from prospective validation and inclusion of additional predictive variables.

Bottom line: Cranial nerve ganglion involvement in head & neck PNF triples malignant transformation risk and accelerates progression—this marker should prompt more aggressive monitoring and management.

Metadata

Category:

1. Neurofibromatosis Type 1
2. Peripheral Nerve Tumors
3. Malignant Peripheral Nerve Sheath Tumor

Tags: neurofibromatosis type 1, plexiform neurofibroma, MPNST, risk factor, cranial nerve ganglion, retrospective cohort

Citation

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1)
Tonsgard JH, Kwak SM, Short MP, Dachman AH. CT imaging in adults with neurofibromatosis-1: frequent asymptomatic plexiform lesions. Neurology. 1998 Jun;50(6):1755-60. PubMed PMID: 9633723.
2)
Leonard JR, Ferner RE, Thomas N, Gutmann DH. Cervical cord compression from plexiform neurofibromas in neurofibromatosis 1. J Neurol Neurosurg Psychiatry. 2007 Dec;78(12):1404-6. Epub 2007 Jul 17. PubMed PMID: 17635968; PubMed Central PMCID: PMC2095617.
3)
Gu Y, Zhu B, Huang J, Long M, Wang W, Wu Y, Wang Z, Li Q. Involvement of Cranial Nerve Ganglion as an Independent Risk Factor for Malignant Transformation of Head and Neck Plexiform Neurofibromas in Neurofibromatosis Type 1. Plast Reconstr Surg. 2025 Jul 8. doi: 10.1097/PRS.0000000000012302. Epub ahead of print. PMID: 40674689.