

Brain abscess etiology

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In [1918](#), Warrington investigated the etiological factors of [brain abscess](#) in 2 groups: 1) infections from foci in the contiguous structures; 2) infections spread through the bloodstream from a distant site ¹⁾.

These infections may result from contiguous spread of infection, hematogenous dissemination of bacteria, previous head trauma or neurosurgical procedure, or immunosuppression. Brain abscess commonly occurs secondary to an adjacent infection (mostly in the middle ear or paranasal sinuses) or due to hematogenous spread from a distant infection or trauma.

Historically direct extension from sinus or scalp infections was the most common source. More recently hematological spread has become most common. Direct introduction by trauma or surgery accounts for only a small minority of cases.

Its important to consider [pulmonary arteriovenous malformation](#) as an etiology of cerebral abscess when routine investigations fail to detect a source ²⁾.

Development of brain [abscess](#) after an [infarction](#) is a rare clinical condition. There have been 11 cases in the literature. Many patients were treated with potent [antibiotics](#) only and did not survive. Wang et al., present 2 cases in which patients received aggressive surgical resection of brain abscess and survived. The analysis of the literature confirmed this finding that surgical intervention of brain abscess in patients after [stroke](#) is advisable.

Secondary abscess formation after significant [ischemic stroke](#) is a rare condition that carries potential for high [morbidity/mortality](#). The limited body of [literature](#) with the addition of our 2 cases supports aggressive management with surgical evacuation of brain abscess to increase survival. ³⁾.

Organisms

[Streptococcus](#) is most common, up to 60 % are polymicrobial.

see [Staphylococcus aureus brain abscess](#)

[Streptococcus pneumoniae](#) accounts for <1% of pyogenic [brain abscesses](#) ⁴⁾.

Risk Factors

[TNF \$\alpha\$](#) (-308 G>A) and [IL-1 \$\beta\$](#) (-511 C<T) polymorphisms that lead to increased production of TNF- α and IL-1 β appear to be risk for development of brain abscess in North Indian population ⁵⁾.

Until recently, post-radiotherapy brain abscess was considered rare, but it has become an increasingly important etiology. Discussions of the relationship between bacterial brain abscess and radiotherapy (RT) are rare in the literature. Further study based on a proper patient cohort is warranted ⁶⁾.

[AIDS](#)

[Chalazion](#)

[Chronic sinusitis](#)

[Chronic otitis](#)

[Congenital cyanotic heart disease](#)

[Infective endocarditis](#)

[Immunodeficiency](#)

[Dental procedures](#), [streptococcus](#) oral flora is frequent

[Penetrating head injury](#).

Pulmonary abnormalities

[Lung abscess](#)

[Pulmonary arteriovenous malformation](#): 50 % have [Osler-Weber-Rendu syndrome](#).

[Lung empyema](#).

Intracerebral haemorrhage

see [Brain abscess after intracerebral hemorrhage](#).

Spread

Prior to 1980 brain [abscesses](#) classically result from [contiguous spread](#) (extension of nearby [infection](#) in the [head](#), [penetrating head injury](#), neurosurgery), [direct trauma](#).

Now [hematogenous spread](#) is the most common vector.

However, up to 30% of brain abscesses have no such associations and thus are deemed [cryptogenic brain abscess](#) ⁷⁾.

Generally occurring after septic episodes in immunodeficient patients or complicating neurosurgical procedures. Even though they are known complications of surgically treated intracerebral haemorrhages (ICH), the presence of a brain abscess at the site of an untreated ICH is a rare event.

Such cases may result from haematogenous spread from distant foci or contiguous sites and are often preceded by episodes of sepsis and local infection. Immunodeficiency, AIDS, age, diabetes mellitus and vitamin-K deficiency are predisposing factors.

Vectors

Hematogenous spread

Multiple abscesses have been noted in 10 to 50% of these patients ⁸⁾.

The chest is the most common origin, from a remote infectious source through right-to-left shunting ⁹⁾. [Lung abscess](#) the most common

In patients with [bronchiectasis](#) and with new neurological manifestations, infected lesions in the central nervous system should be excluded.

In [children](#) [congenital cyanotic heart disease](#), especially [tetralogy of Fallot](#).

[Right to left shunting](#) ([Pulmonary arteriovenous malformation](#)).

[Osler-Weber-Rendu syndrome](#)

Bacterial [endocarditis](#)

[Dental abscess](#)

Infections of the abdomen – such as peritonitis (an infection of the bowel lining).

Pelvic infections – such as infection of the bladder lining (cystitis).

[Septic embolism](#) in areas of previous brain [infarction](#) or [ischemia](#).

Fibrosis lung disease

Is an uncommon complication of severe [cystic fibrosis](#) lung disease ¹⁰⁾.

Contiguous spread

Purulent sinusitis

[Osteomyelitis](#) or [phlebitis](#) of [emissary veins](#).

[Otitis media](#).

Brain abscess from odontogenic infection

[Brain abscess from odontogenic infection](#).

Brain Abscess Following Cerebrospinal Fluid Fistula

[Brain Abscess Following Cerebrospinal Fluid Fistula](#).

1)

W. B. Warrington; Critical Review: Abscess of the Brain, QJM: An International Journal of Medicine, Volume os-11, Issue 42, 1 January 1918, Pages 141-164, <https://doi.org/10.1093/qjmed/os-11.42.141>

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10)

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