

Opiate and Cerebral Atrophy

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Heroin, morphine, and other opiates trace their origins to a single plant, the opium poppy.¹ The opium poppy (*Papaver somniferum*) from which opium is derived is one of the earliest plants, which was recorded to have medicinal use.² Cultivation of the plant dates back to the earliest years of human civilization, and opium use was well-known in ancient Mesopotamia.³ The narcotic drug has been used both recreationally and as a medicine for centuries. Opium clay tablets are the earliest prescriptions found in Sumerian civilization, 8000 years ago.^{3,4} Ancient Greeks, Indians, Chinese, Egyptians, Romans, Arabs, and Europeans from renaissance to now knew opium as an ever-approved next-door medicine—a panacea for all ailments.³ Opium use by known leaders and personalities like Homer, Franklin, Napoleon, Coleridge, Poe, Shelly, Quincy, Hitler, and many more have removed the label of immorality from its use.³ Opium derivatives, including morphine, became widely used as pain relievers, particularly in the 1800s.⁵

Are the opioids a curse or cure? Opiates are both a dangerous recreational drug and the nature's best form of pain relief. Opioids having dependency and abuse potentials, multiple cellular and molecular mechanism involved in it, one important of which is feedback inhibition of endogenous opioid synthesis.

Opium like recreational drug abuse is a serious health problem which poses detrimental effects on the central nervous system. Neuroimaging plays a pivotal role in detection of these abnormal changes in the brain associated with the drug abuse.⁶ Study focuses on the grading of cerebral atrophy in the opioid-addicted patients and their association with the age and duration of opioid abuse.

Commonly abused opium and its derivatives are *afeem*, a latex extract of poppy plant, and *bhukki*, a preparation of dried leaves of poppy plant, are consumed orally. Other abused synthetic opioid *chitta*, the famous local name for heroin, is either inhaled or taken intravenously for its recreational effect. It is one of the costlier preparations of opioid next to buprenorphine. Buprenorphine is a synthetic opioid taken orally and also a costlier abused synthetic drug compared to tramadol.^{7,8}

Chronic opioid use causes not only drug dependency but impaired brain functioning from brain atrophy.^{9–11}

A retrospective study in Punjab was carried out on 40 patients of opioid abuse who were admitted to the intensive care unit of the hospital over a period of 2 years. Magnetic resonance imaging scan of these patients was done using Siemens Avanto 1.5 Tesla scanner. All the patients were male, with 25 patients having varying degrees of cerebral atrophy as assessed by Pasquier Scale. Majority of the patients ($n = 14$) on chronic opioid abuse had a global cortical atrophy score of 1 indicative of mild cerebral atrophy. The associated factors like duration of abuse and the age of presentation had significant association with the cerebral atrophic changes in the brain ($p < 0.05$). Opioid-dependent patients with long-term substance abuse had probable association with the atrophic changes in brain as assessed from neuroimaging.

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The progressing age and longer duration of drug abuse may foster significant alterations in the brain structure, leading to varied degree of cerebral atrophy.¹²

Maximal opioid abused duration was seen up to 12 years, beyond which there was a decrease in opioid continuation, and probably this decrease in incidences from abuse-related issues, increasing age and dangling economic conditions. Abuse was relatively more in rural population and among those with less education. As obvious, middle-aged population commonly involved in opioid abuse. Significant proportion (62.5%) of chronic opioid abusers had variable degree of cerebral atrophy. Ten percent of abusers developed severe grade atrophy with severe ventricular enlargement.

People need to be educated not only about the stringent legal conditions for opioid use but also about opioid addiction and its adverse effect on health, career, and the overall life.

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