



Terapijski potencijal N-acetilcisteina

Therapeutic potential of N-acetylcysteine

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Apstrakt

N-acetilcistein je prekursor L-cisteina i redukovano glutatona čiji se efekat i primena zasniva na njegovim antioksidacionim i antiinflamatornim svojstvima. Dobre farmakokinetičke karakteristike, bezbednost primene u većim dozama i u svim uzrastima (izuzev dece mlađe od 2 godine) ga čine široko primenjivanim u kliničkoj praksi. Indikacije za koje je N-acetilcistein registrovan za primenu u Republici Srbiji i za koje se može dobiti bez lekarskog recepta su akutni bronhitis, akutne epizode hronične opstruktivne bolesti pluća, cistična fibroza, emfizem pluća i bronhiektazije. U svim pomenutim indikacijama se primena N-acetilcisteina zasniva na njegovoj mogućnosti da izvrši hidrolizu disulfidnih veza u okviru polimera mucina svojim slobodnim tiolnim grupama i time smanjenjem njegovog viskoziteta olakša iskašljavanje. U svetu se pored navedenih indikacija N-acetilcistein primenjuje, odnosno ispituje za potencijalnu primenu u domenu poboljšanja stanja kod mnogih neuroloških oboljenja, poput Parkinsonove i Alchajmerove bolesti, Daunovog sindroma, multiple skleroze, amiotrofične lateralne skleroze, subarahnoidalne hemoragije, traumatske povrede mozga i drugih neurodegenerativnih bolesti mozga. N-acetilcistein se može primeniti oralno, intravenski i inhalaciono, a način aplikacije zavisi od uzrasta, indikacije i potrebe za brzim efektom, što je posebno značajno ukoliko se N-acetilcistein primenjuje kao antidot kod trovanja acetaminofenom. Kao antidot se u visokim koncentracijama koristi i u slučaju trovanja gljivama koje sadrže amanitin i halogenim ugljovodonicima. Takođe, veliki potencijal i povod za dodatna istraživanja predstavlja i pozitivan efekat primene N-acetilcisteina kod rešavanja problema sa zavisnošću od pojedinih supstanci, usled njegovog uticaja na razmenu cistein/glutamat u nucleus accumbens-u. Sve pomenute indikacije se smatraju potencijalnim, a kako bi se preciznije definisala preporučena doza, bezbednosni aspekt i dužina primene N-acetilcisteina u tom domenu, potrebno je koncipirati više dobro osmišljenih, kvalitetnih, multicentričnih, kontrolisanih kliničkih ispitivanja. Posebnu pažnju u navedenim istraživanjima treba obratiti na postojanje polifarmacije, naročito kod starije populacije, prepoznavanju potencijalnih interakcija i blagovremenom uočavanju neželjenih reakcija.

Abstract

N-acetylcysteine is a precursor of L-cysteine and reduced glutathione, the effect, and application of which are based on its antioxidant and anti-inflammatory properties. Good pharmacokinetic characteristics, the safety of use in higher doses, and at all ages (except for children younger than 2 years) make it widely used in clinical practice. Indications for which N-acetylcysteine is registered for use in the Republic of Serbia and for which it can be obtained without a doctor's prescription are acute bronchitis, acute episodes of chronic obstructive pulmonary disease, cystic fibrosis, emphysema of the lungs, and bronchiectasis. In all the above indications, the use of N-acetylcysteine is based on its ability to hydrolyze disulfide bonds within the mucin polymer with its free thiol groups and thereby facilitate its expectoration by reducing its viscosity. In addition to the above indications, N-acetylcysteine is used worldwide for potential use in the field of improving the condition of many neurological diseases, such as Parkinson's and Alzheimer's disease, Down syndrome, multiple sclerosis, amyotrophic lateral sclerosis, subarachnoid hemorrhage, traumatic neurogenic brain injury, and brain diseases. N-acetylcysteine can be administered orally, intravenously, and by inhalation, and the method of application depends on age, indication, and the need for a rapid effect, which is especially important if N-acetylcysteine is used as an antidote for acetaminophen poisoning. It is also used as an antidote in high concentrations in the case of poisoning by fungi containing amanitin and halogenated hydrocarbons. Also, great potential and reason for additional research is the positive effect of the use of N-acetylcysteine in solving the problem of dependence on certain substances, due to its effect on the exchange of cysteine /glutamate in the nucleus accumbens. All the mentioned indications are considered potential, and in order to more precisely define the recommended dose, safety aspect, and length of application of N-acetylcysteine in that domain, it is necessary to design more well-designed, quality, multicenter, controlled clinical trials. Special attention in these studies should be paid to the existence of polypharmacy, especially in the elderly population, the recognition of potential interactions, and the timely detection of adverse reactions.