INTERNATIONAL
IV NUTRITIONAL THERAPY
GLOBAL PHYSICIAN EDUCATION

Glutathione and Phosphatidylcholine

Advanced IV Therapy: Chronic Disease and Infections
by
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Glutathione

- 60 to 200 mg/ml
- A tripeptide synthesized from Glycine, Glutamic acid and Cysteine
- Primary intracellular antioxidant – essential to life
- Important supporter of chelation of lead, mercury, cadmium, arsenic

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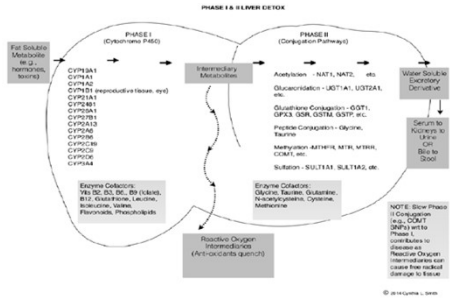
Picture from MTHFR Support



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Glutathione

- Can prevent or reverse alcohol induced fatty liver, cirrhosis, hepatitis, liver tumors
- Inhibits chemical induced carcinogenesis
- Improves prognosis of stroke/TBI victims
- Useful in any condition where there is risk for oxidative damage

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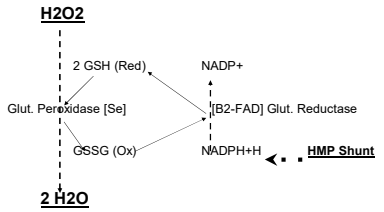
Glutathione

The Glutathione Redox Cycle and Peroxide



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Glutathione (GSH)

- 500 mg is a reasonable starting dose for conditions benefiting from GSH
  - MCS patients may do better starting at 100-200 mg
- Evaluate how patient tolerates dose before giving high doses, e.g. build up dose over time incrementing 500 mg per infusion
- Protocols for the treatment of Parkinson's Disease use from 2400-3600 mg
  - This dose has been as high as 10,000 mg

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Glutathione & Parkinson's Disease

- David Perlmutter, MD, has done extensive work with Parkinson's patients and finds GSH essential
- Dr Perlmutter's protocol
  - Typically starts GSH at 2400 mg twice weekly
  - Some patients require 3600 mg GSH daily
  - Given by push over 5-8 minutes following a nutritional IV

*Personal communication June 2007

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l-dopa depletes sulfur amino acids

- Glutathione is a sulfur amino acid and a powerful antioxidant that neutralizes neurotoxins that may cause Parkinson's disease
- Implications of sulfur amino acid depletion relating to Parkinson's disease include depletion of:
  - Glutathione leading to progression of Parkinson's disease
  - The enzymes required to synthesize l-tyrosine to l-dopa
  - s-adenosyl-methionine, the body's one carbon methyl donor
  - Epinephrine

Ref: Hinz M, Stein A, Uncini T. Amino acid management of Parkinson's disease: a case study. Int J Gen Med. 2011; 4: 165–174.

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Glutathione

- Important role in immune function via white blood cell production and is a potent anti-viral agent
- It is one of the strongest anti-cancer agents made by the body
- Glutathione levels decrease with age. It is involved in cellular differentiation and slows the aging process

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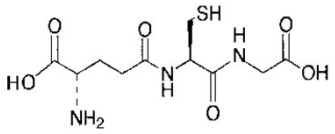
Glutathione

Gamma-glutamyl-cysteinyl-glycine



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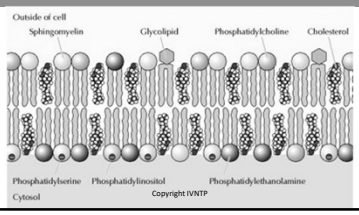
Phosphatidylcholine



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Cognitive improvement in mild to moderate Alzheimer's dementia after treatment with the acetylcholine precursor choline alfoscerate: A multicenter, double-blind, randomized, placebo-controlled trial

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Abstract

Background: Parallel with the development of hypotheses regarding cholinergic involvement in geriatric memory dysfunction, the first attempts to treat patients with Alzheimer's disease (AD) involved the cholinergic-precursor loading approach. Despite encouraging early results, well-controlled clinical trials did not confirm a clinical utility of cholinergic precursors such as choline and lecithin (phosphatidylcholine) in AD.
Objective: This study assessed the efficacy and tolerability of the cholinergic precursor choline alfoscerate (CA) in the treatment of cognitive impairment due to mild to moderate AD.
Methods: In this multicenter, double-blind, randomized, placebo-controlled trial, patients affected by mild to moderate dementia of the Alzheimer type were treated with CA (400-mg capsules) or placebo capsules, 3 times daily, for 180 days. Efficacy outcome measures that were assessed at the beginning of the investigation and after 90 and 180 days of treatment included scores of the Alzheimer's Disease Assessment Scale–Cognitive Subscale (ADAS-Cog), the Mini-Mental State Examination– (MMSE), the Global Deterioration Scale (GDS), the Alzheimer's Disease Assessment Scale–Behavioral Subscale (ADAS-Behav), all items of the Alzheimer's Disease Assessment Scale (ADAS–Total), and the Clinical Global Impression (CGI) scale. The Global Improvement Scale (GIS) score was assessed after 90 and 180 days of treatment.

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Indications

- Liver
- Mold toxicity
- Cardiovascular
- Post stroke recovery: Glycerophosphocholine
- Encephalopathy
- Memory, cognitive decline
- Any cell membrane support

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Phosphatidylcholine (PTC)

- Methyl donor
- Cell Membrane structural support and maintenance
- Highly metabolic tissues
  - Brain / Heart / Kidney / GI
  - High concentration in brain CM's
    - May help with concentration
    - Donates Choline for ACh synthesis
      - Used for cognitive support
- Liver damage (Drug / ETOH / Hep - B,C)
  - Also appropriate in NASH

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Phosphatidylcholine (PTC)

- Multiple IV protocols are published.
  - All appear to have their own merit based on clinical reports from physicians employing them in similar groups of patients.
  - The following is the protocol I feel is best to begin with, and has the least phlebitis and other side effect potential

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Phosphatidylcholine (PTC)

- Protocol:
  - Infuse slowly (higher concentrations and faster administration will cause phlebitis) over 1 hour if tolerated.
  - No other additives are mixed with this infusion
  - You can follow or lead with a different nutrient bag.
  - **MUST FLUSH OR CHANGE LINE** between bags
  - Sensitive patients (MCS, Elderly, Multiple co-morbidities) may experience **GI distress** – RAMP Those patients doses up slowly from 10 mL starting dose.

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IV PTC benefit to Oral

- **IV is best until you know your patient!**
- Cleveland clinic has found that choline can contact certain bacteria in the intestines which converts choline to TMA. In the liver there is an enzyme that makes TMAO (Trimethylamine-N-oxide)
- TMAO forms vascular inflammation and unstable plaques in the arterial walls.

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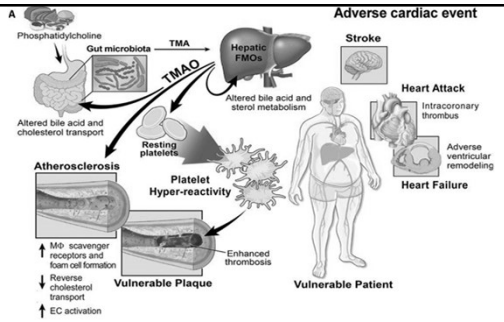

http://dx.dol.org/10.1016/j.cell.2016.02.01101

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PTC (Intravenous Protocol)

- PC 35mg/mL OR 50mg/ml, Sodium Deoxycholate 24mg/mL, Benzyl Alcohol 0.9% and Ethanol 0.2%.
- Basic protocol:
  - Increment dose and infuse over 90 minutes
  - 25 ml PTC (maximum 50 ml of 50 mg/ml) in 250-500 mL D5W **(MUST BE IN NON-IONIC carrier). Some forms are now stable in Normal Saline.**
  - Optional: Follow with glutathione push
- Caution is can cause GI upset and diarrhea. Work up slow and consider fiber.
- Caution as phlebitis is common if given to rapidly. More phlebitis noticed with injectable compound in the USA due to stabilizers.

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Rx: Phosphatidylcholine

		PTC (35-50 mg) (3-50 mls) D5W (250-500 ml)		

Additions /Subtractions:

Glutathione + 0.9% Normal Saline

Total Volume: mL Osmolarity: mOsm/L

*****Some forms of PTC are now stable in Normal Saline. Take to your compounding pharmacy.

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NEVER MIX ANYTHING IN THE SAME BAG WITH PTC!!

•Precipitates with other minerals and can also cause thrombus when mixed with other nutrients.

•You may run other nutrients in the same day or a series of infusions. Make sure to change for flush the line between PTC and the nutrients.

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(The "Push Protocol")

- Draw 5 to 10 ml Essentiale-N into a syringe at least twice the volume, leave 5 ml air in syringe
  - Some add 0.5 mL heparin, 1000 IU/mL
- Establish the IV using a 21 or 23 gauge butterfly set & draw an equal volume blood into syringe
- Mix the blood and Essentiale-N during and after drawing sufficient blood into the syringe
- Immediately inject the mixture over 2-3 minutes, keeping the air bubble uppermost in syringe to avoid injecting air
- Remove empty syringe and attach syringe for glutathione push, 600-2500 mg
- Injections are given 3-5 times weekly until liver tests normalize
- It may be more prudent to add the Essentiale-N to 250 mL D5W and infuse over 90 minutes
- Flush butterfly – administer glutathione IV push

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Parenteral PC Caution

- Phosphatidylcholine is compounded by a number of pharmacies in the U.S. for use in Mesotherapy. This is commonly 100 mg/mL concentration. This formulation can not be used for intravenous applications.

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More Research

- Hepatic disease – Vnitr Lek 2000 apr;46(4):199-204. 2 g daily for 2 weeks resulted in 50% decrease in ammonia levels in patients with cirrhosis and hepatic encephalopathy
- Hepatic disease – Med Monatsschrift 27:131-137, 1973. Essential phospholipids in the treatment of hepatic disease. 650 subjects with varying liver damage followed 5 years. Patients received 950 mg IV PC with 450-700 mg oral PC, when labs normalized received oral PC only. All groups benefited: reversal of fatty degeneration, acute inflammation recovery accelerated.
- Protects liver against damage from alcohol, pharmaceuticals, environmental toxins and zenobiotics as well as infection (viral, bacterial, fungal). Alcoholism Clin Exp Res 18:592-595, 1994.; Gastroent 106:152-159, 1994.; Clin Exp Res 23:5:944-949, May 1999.; Pathol Biol (Paris) 49(9):738-752, Nov 2001.; Am J Addict 10 Suppl:29-50, 2001.
- Cirrhosis: Marked improvement of liver function following PC administration in terms of an increase in metabolic and detoxifying capacity of liver was noted. Pogromov, AP et al. Klin. Med. (Moscow)10(1978)97.

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