The Nutritional Supplementation during 80 Consecutive Days with Glutathione (GSH), Alpha Lipoic Acid among other Bioactive Phytomolecules Significantly Rise Systemic (GSH) Levels and Reduces Hair’s Aluminium (Al) in Patients

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Abstract: Background: Several studies have demonstrated that elevated Aluminium (Al) levels contribute to Alzheimer or ALS Multiple sclerosis pathophysiology. Aim: we have described three cases of patients who had extremely elevated Aluminium levels (Al) (before any treatment) by unknown causes. Results: These patients reduces 48 % their Aluminium levels and rise (67 %) GSH (Glutathione: reduced form) levels after 80 days of nutritional supplementation with Glutathione, Selenium (Se), alpha lipoic acid among other bioactive phytomolecules (Glutathione Complex formulation (GC), Celsus Lab, Spain) as compare their respective basal levels(controls : BEFORE any treatment). Conclusion: The GSH rise suggest that Glutathione (GSH) is recycled to remove excessive Aluminium (Al) level by conjugation. Since elevated Aluminium (Al) levels contribute to the progression of Alzheimer (AD)/ALS (Multiple sclerosis) disease, these bioactive phytomolecules as Glutathione, Selenium (Se), alpha lipoic acid from GC formulation may recycle Glutathione and reduce Al levels in patients.

Keywords: Glutathione (GSH), Aluminium, neurotoxicity

1. Introduction

The chronic Al administration (2 g/L/6 months) to aged rats rise ion metal release and affects Mossy fibers organization in the brain (1). It is necessary to investigate how bioactive phytomolecules with antioxidant properties may chelate or reduce Aluminium (Al) levels in patients. The role of Aluminium (Al) in the progression of Alzheimer disease (AD) is controversial. Al contribute to amyloid beta or tau deposition in AD (2) although addition in the drinking water did not influence CNS Alzheimer-like pathology (3). In fact, systemic Al levels did not differed between AD patients and participants with minor cognitive impairment (MCI) (4).

The bioltrace element Selenium (Se) is necessary for Glutathione synthesis (GSH) and contribute to the excretion of heavy metals by conjugation with its reduced form (5,6). The dietary supplementation with Se can reactivation endogenous detoxification systems to remove excessive free radicals (6). Recently, a study indicates that grape seed extract supplementation significantly rise Glutathione (GSH) levels and decreases lipoperoxide as compare with their placebo groups (7). Other bioactive phytomolecule from Glutathione Complex formulation (GC, Celsuslab, Spain) is Cephalosporium mycella, which contribute to the bioremediation of organic pollutants in metal-organic mixed environment areas (8). The therapeutic role of Asianticosides from Centella asiatica, (present in Glutathione complex, GC formulation), is associated to CYP (CYP450, CYP3A4, CYP2D6, CYP2C9) without harmful effect (9). Aim: We have studied whether 80 days of nutritional supplementation with Glutathione and alpha lipoic acid in GC formulation (GC) could rise GSH levels and reduce Al levels in patients as compare their respective basal levels.

The Glutathione Complex (GC) formulation contains these bioactive phytomolecules.

Glutathione Complex formulation (Celsus Lab, Spain) composition/day

Dry Extract of Cordiceps (Cephalosporium mycella, 70 %): 400 mg
Cephalosporium mycella, 7 % of manitol
N acetyl cysteine (NAC): 350 mg
Alpha Lipoic acid: 200 mg
L-glutamine: 200 mg
Calcium ascorbate: 200 mg
Dry extract of Sillyum marianum, 80 % of silimarina: 150 mg
Dry extract of Asian Centella, 3 % of Asianticosides: 150 mg
Acetil L-carnitine: 150 mg
Dimetil-glicine: 120 mg
L-Glutathione (reduced form, GSH): 100 mg
SAMs (s Adenosyl L Methionine): 100 mg
Dry extract of Brecol (Brassica oleracea, 0.3 % of sulphoraphane): 50 mg
Vitamine E (mixture of different tocophersols): 60 mg
Vitamine C: 163 mg
Zinc Citrate: 15 mg

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Vitamine
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2000).
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participants
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by
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the
appropriate
informed
consent
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to
Helsinki
Declaration
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and
2000).
All
efforts
have
been
made
to
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patient
privacy
and
anonymity.
CIROM
Clinic
(Centro
de
Implantologia
Oral
Multidisciplinaría,
Murcia,
Spain)
has
been
approved
and
certificated
by
AENOR
Agency
(Spain: CIROM
CERTIFICATE
for
dentist
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services:
CD-2014-001
number;
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following
UNE-EN
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9001:
2008
as
well
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179001-2001
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from
Spain).
Inclusion
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recruited
patients
with
high
Aluminium
(Al)
levels
(>7
microg/hair).
The
normal
range
for
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between
0-7
microg/g
of
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in
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population
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DATA
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80
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nutritional
supplementation
with
Glutathione
Complex
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(GC)
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current
treatment
for
iron
deficiency
(anemia).
They
have
no
history
of
liver/kidney
disease/autoimmune
disease/renal
diseases/Cushing
Syndrome/metabolic
diseases/tiroid
pathology.

3. Results

The
nutritional
supplementation
with
Glutathione
(GSH),
Selenium
(Se)
and
alpha
lipoic
acid
significantly
rise
Glutathion
levels
(Reduced
form)
and
decreases
hair’s
Aluminium
(Al)
levels.

Their
basal
hair’s
Aluminium
(Al)
levels
were
measured
by
ICP-MS
and
systemic
GSH
levels
(reduced
form)
were
detected
by
colorimetric
assay
(BEFORE/AFTER
80
days
of
GC
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following
Cabaña-Muñoz
et
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procedure
(11).
We
found
significant
systemic
GSH
rise
and
lower
hair
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levels
after
80
days
of
supplementation
(AFTER)
with
GC
formulation
(GC,
Celsius
Lab).
This
product
contains
Glutathione
(GSH),
alpha
lipoic
acid,
Selenium
(Se)
and
mushrooms
among
other
bioactive
phytomolecules
(GC,
see
composition).
Their
basal
Al
control
(BEFORE)
are
100
%(Controls).
The
systemic
GSH
rise
was
compared
after
80
days
of
GC
supplementation
(AFTER)
and
their
basal
levels
(100%:
BEFORE
any
supplementation)
There nutritional supplementation with GC formulation significantly rise GSH levels (67 %, GSH: reduced form) and also reduces hair Al levels (48 %) after 80 days of Glutathione Complex (AFTER, GC) treatment as compare with their respective controls (BEFORE treatment). Results are expressed as control percentage.

4. Discussion

The nutritional supplementation with GC formulation during consecutive 80 days reduces hair’s Al levels and rise systemic GSH levels. GC formulation contains several bioactive phytomolecules as Glutathione (GSH), alpha lipoic acid, Selenium (Se) and Musrooms. These findings suggest GSH can be recycled in order to remove excessive Al levels in patients. Since high Al levels contribute to Alzheimer disease pathology (2), this chronic supplementation (with Glutathione, its precursors, Se and alpha lipoic acid among other synergic phytomolecules) may reduce Aluminium levels through conjugation with Glutathione. In addition, alpha lipoic acid from GC formulation may rise GSH levels since alpha-lipoic acid protects against oxidative stress-induced cadmium (Cd, other heavy metal) by increasing glutathione synthesis “in vitro” (10). Previously, we have demonstrated systemic GSH rises together elevated mercury hair’s in women who have long-term dental amalgams levels (11). In addition, Silimarime from Gluthathione Complex (GC) formulation may reduce Al levels because the chronic similarine (Sillyum marianum, 200 mg/Kg/day) treatment significantly reduces Al-induced cognitive impairments and induces GSH synthesis. Al-neurotoxicity was induced during 42 days of treatment in this study (12). This concentration is the same in patients (200 mg/day). These elevated Al levels in the aged brain increases the susceptibility to oxidative stress. Once could expect that chronic supplementation with bioactive phytomolecules from GC formulation as Glutathione, Selenium (Se), alpha lipoic acid may enhance endogeneous antioxidant capacities in order to remove excessive Al levels in patients. As a consequence of GSH rise, these bioactive phytomolecules may reduce the susceptibility to oxidative stress. Since oxidative stress aggravate the progression of neurodegenerative disease (also AD), these bioactive phytomolecules could reduce Al-induced toxicity. In agreement with this hypothesis, selenium (a trace element necessary for Glutathione peroxidase activity: GPx) promotes glutathione synthesis (5). Se could enhance the chelation of Aluminium together sSAM (S-Adenosyl-Metionine) and cysteine. Thus, Glutathione and Se could chelate or enhance Al excretion by rising GSH levels in these patients. The abnormal Al metabolism were reported in two siblings with progressive CNS calcification (13). Other case of ALS (Amiotrophic Lateral Sclerosis) that did not remit with conventional ALS treatment reported lower Al levels after 30 days of EDTA treatment (chelator, twice/day). The clinical improvement on ALS sintomatology correlated with Al reduction in the urine to normal range, suggesting that Al may contribute to ALS pathology (14). These reduced Al levels after nutritional supplementation with bioactive phytomolecules from Glutathione Complex (GC) agrees with decreased Al-induced gliosis described in the prefrontal cortex of rabbits after treatment with two Aluminium quelates (desferroxamine (DFO) and six-hypodrixpyridin-4-ones, CP) (15). The induction of detoxification capacities from mushrooms as Cephalosporium mycella (Cordiceps) can be used as therapeutical agent (16). Collectively, the nutritional supplementation with GC formulation during 80 consecutive days rise systemic GSH levels and reduces hair’s Al levels. Vitamine B12, B6, E and C together N acetyl cysteine can synergically promote beneficial effects in the present study (11). Further studies will confirm whether Gluthation treatment may reduce Al levels in a cohort of patients.

5. Conclusion

Since high Aluminium (Al) levels contribute to Alzheimer or ALS Multiple sclerosis pathology, the chronic supplementation with bioactive phytomolecules from GC formulation (Gluthathione, GSH), Selenium (Se), alpha lipoic acid) may recycle Gluthathione levels (GSH) and reduce hair’s Aluminium levels as preventive agents in patients.

6. Conflict of interest

None to declare by all authors

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