case reports
THE CARE GUIDELINES

CASE REPORT

Case reports are profesional narratives that outline the diagnosis, treatment, and outcomes of the medical problems of one or more patients. Information from case reports can be shared for medical, scientific, or educational purposes. They provide a framework for early signals of effectiveness adverse events, and cost. Case reports and the systematically collected data from which they are written also provide feedback on clinical practice guidelines.

10-year-old boy with chronic constipation, seizure disorder, and mood/behavioural changes

Abstract.

This case explores a holistic approach to the treatment of chronic constipation, a seizure disorder, and mood/behavioural changes, all co-existing issues in this young man, and which worsened with standard pharmaceutical treatments.

The chronic constipation experienced by this young boy, B.K., had been treated by his primary care paediatrician and gastroenterologist with an osmotic laxative (Miralax) on an ongoing daily basis for 5 years. After chronic exposure to the compound polyethylene glycol (PEG) found in Miralax, this young man developed a sensitivity to it and propylene glycol (PG), a similar polymer, which are commonly used as food additives. He began to experience simple partial seizures when exposed to these compounds. Mood/behavioural changes (agitation, anxiety, obsessive compulsive behaviours) had been gradually developing as well, and were dramatically worsened with trials of different anti-epileptic medications for the management of his seizures. Additional factors which were issues with this case was an unknown birth-parent history, and adoptive parents with different attitudes about what was an appropriate medical approach to treatment.

Many holistic strategies including dietary changes, supplementation, and counseling were utilised to address the multiple symptoms which B.K. was experiencing. A urinary Organic Acids Test was requested by the father and was performed, as well as a comprehensive digestive stool analysis as suggested by the provider. A lactulose breath test and food sensitivity testing were options suggested but were not something the parents elected to do. Dietary recommendations were made to focus on an organic/whole food/minimal dairy diet with the avoidance of foods with the PEG or PG compound, as well as sugar alcohols (mannitol, xylitol, and sorbitol) which it has been reported that individuals with PEG or PG sensitivity also may react to.

Supplementation strategies focused on treatments to support the gut integrity and flora balance, support for the reduction of anxiety and seizure threshold, antioxidant therapies, as well as support for nutritional deficiencies which can occur with long term treatment with Valproic acid.

Through the course of 9 months of working together, B.K. experienced a dramatic improvement in his behavioural symptoms and he had been seizure free for 7 months at a dosage of Valproic acid considered to be below the therapeutic threshold. The parents were very grateful for these improvements, and had developed more synergy in their collective attitude towards treating him with more natural modalities. As a practitioner, the management of a seemingly complex paediatric case was found to be quite straightforward and was without adverse complications with the use of nutritional therapies. After working with these individuals, B.K.'s father continued to refer several individuals from a parent "Miralax awareness" group to my practice.

Key Words.
Seizure disorder, chronic constipation, conduct disorder, anxiety, polyethylene glycol (PEG)

Introduction.

B.K. was a 9-year-old boy at the time he first presented. He had been diagnosed with a seizure disorder approximately a year prior. B.K. began to experience simple partial seizures accompanied by vomiting which the parents associated with chronic exposure to polyethylene glycol (PEG), a polymer that is the basis of a commonly used osmotic laxative. The ongoing use of this PEG-based laxative had been recommended for the chronic constipation which B.K had experienced for the last 5 years. In this time he had been taking this compound daily for maintenance of regular bowel habits. At the time of the first consult, the father reported he had experienced 21 seizures within a period of 9 days after a recent exposure to the compound PEG, which is also an additive in many foods and medications. This last episode his father felt had been triggered by exposure to PEG in a children's acetaminophen product.

Additional background potentially relevant to this case was the birth history of B.K. B.K. had been adopted by the parents who brought him in to the clinic. It was known that his birth mother experienced severe migraines and attention-deficit hyperactivity disorder (ADHD) while on his birth father's side there was a significant history of heart disease. B.K. experienced sensory-integration issues and tantrums when younger, which had resolved in recent years. He also experiences a very high level of anxiety, and had chronic headaches and separate episodes of vomiting approximately twice monthly prior to the seizure disorder developing. A dramatic change in his behaviour for the worse had been seen since being on different seizure medications in the past year. He would routinely become angry and frustrated, smashing his glasses, swearing, and engaging in activities that put his own health at risk, as well as that of his mother.

Presenting Concerns.

The primary issues which the parents of B.K. came to the clinic seeking support with were the seizure disorder, digestive symptoms of periodic vomiting and constipation, and the behavioural issues and accompanying anxiety. Additional issues which were not stated as concerns were allergies to pine and mould spores in the fall, as well as an asthmatic reaction with colds which seem to migrate to his lungs resulting in a severe cough and bronchitis.

Simple Partial Seizure. The simple partial seizure disorder which B.K. has been diagnosed with was never picked up on the electroencephalogram (EEG) previously performed. When the episodes which have been diagnosed as seizures occur, B.K. looks as if he is stunned, and will cease what he is doing. He becomes very flushed in the face, and often vomits and will be very tired afterwards. He can tell when the seizure-type episodes will occur, and is coherent during these episodes. If B.K. is in a setting in which he does not want to vomit he is also able to control this symptom. The symptom of vomiting which B.K. experiences at the time of the seizure symptoms was stated by the neurologist to not be associated with the region of the brain in which this type of seizure activity would occur.

Constipation. Parents determined dairy was a contributing factor which is now minimised. Constipation began when he was 5 years of age and had been treated with the daily use of a polyethylene glycol (PEG)-based osmotic laxative for several years until more recently the father had determined this may be contributing to the

seizure episodes. Constipation has been improved since a recent “clean-out” at the hospital, and at the time of presenting to the clinic B.K. was experiencing regular stools with the support of chia and flax seed daily.

Vomiting. Periodic vomiting was a symptom that B.K. started to experience approximately 2 months prior to the seizures. Episodes starting with an upset stomach come on quickly and then resolve. However now the vomiting episodes do not occur outside of the seizure activity. An upper endoscopy has been done and was normal. The neurologist states that the location of the brain in which the activity likely occurs during a simple partial seizure is not a region which would be associated with the symptom of vomiting.

Behavioural issues and anxiety. As a young child B.K. experienced sensory-integration difficulties and some tantrums. He is very sensitive to smells, textures, and tastes. Upon starting the anti-epileptic medications, B.K. experienced a severe worsening of symptoms. He became much more impulsive, experiencing tantrums and fits of rage in which he becomes unsafe to himself and his mother. It is stated that his eyes glaze over, and he appears to be absent in his body. He frequently breaks his glasses, or also may hit inanimate objects or his friends. Negotiation becomes impossible. The behavioural symptoms were worse with one seizure medication which was later found to contain PEG as an additive.

Clinical Findings.

There were no abnormal findings with physical examination, and in office B.K. was quiet and did not answer questions without prompting by his parents. He attention was very focused on an electronic device during the entire 1.5-hour intake visit. He is on the medications Depakote 125 mg twice daily, Ibuprofen as needed for his headaches, and Albuterol and Flovent as needed when he has a chest infection. Midazolam as an injection is held in a syringe at his school for use if needed if a more severe seizure develops.

Timeline.

2005
B.K. is born and adopted.

2008
B.K. has paediatric febrile seizure.

2010
B.K. begins to experience severe chronic constipation and is prescribed PEG-based laxative which is taken daily.

2012
B.K. begins to experience chronic headaches twice a month.

2014, early
Vomiting symptoms begin.

2014, March
B.K. has multiple seizures over the period of several days after exposure to PEG in children’s acetaminophen product which he is given for a headache. In emergency room, no seizure activity is seen on EEG during the short period in which this is assessed.

2014, May
Simple partial seizure disorder is diagnosed and various seizure medications begin to be trialled as a means of controlling his symptoms.

2015, April
B.K. first is seen in my office.

Diagnostic Focus and Assessment.

A full work up for the condition had been performed by this child's paediatrician, a gastroenterologist, and neurologist, and laboratory testing was out of the focus of the practitioner in the state where B.K. was seen, no additional standard laboratories were performed. However, a urinary Organic Acids Test as well as a comprehensive digestive stool analysis with parasitology x 3 were recommended to look for imbalances that may be contributing to the symptoms B.K experienced. Additional tests which were recommended and not pursued by the parents were a food sensitivity test and a small intestinal bacterial overgrowth breath test.

Therapeutic Focus and Assessment.

28.4.15

B.K. is initially seen in office. Symptoms at the current time do not include constipation, however there is a long history of constipation as described. Parents state that constipation has been resolved since his last "clean out" at the hospital (ie colonic or enema procedure) and bowel patterns have been maintained with regular elimination utilising chia or flax seeds daily in a smoothie. His last significant seizure episodes began around 15.3.15 after having exposure to PEG as a medical excipient in a children's acetaminophen product which he was given for his headache.

The current seizure medication being take is Depakote (Valproic acid) at a dosage of 125 mg twice daily. The serum therapeutic range of valproic acid is usually in the 50 to 125 mcg/mL, and with the most recent testing B.K. had been at a level of 44 mcg/mL prior to a reduction in the medication. Hence, his parents are uncertain if the drug is doing anything. The medication dosage was reduced because it had heightened his sensory issues, and behaviours of aggression towards himself and others. A previous medication Trileptal (Oxcarbazipine) had not been helpful for his seizures and possibly had made them worse, however at the time he was still on the PEG-based laxative as the possible connection with his seizures had not been made. Trileptal also contains PEG as an ingredient. When he was on Keppra (Levetiracetam), another anticonvulsant which had been tried, his behavioural issues were much worse, and he even attempted to jump off their outside deck when he was agitated.

B.K. had been seen by a gastroenterologist and a normal endoscopy had ruled out abnormalities which may have contributed to his vomiting. He had also been seen by a neurologist and the seizure disorder was diagnosed, however activity that would be diagnostic for a simple partial seizure was not seen with EEG assessment.

B.K.'s history included the chronic constipation since 5 years of age, adoption with minimal knowledge of birth parents other than a mother's ADHD and migraine headaches, and father's side problems of heart disease. He is an only child for the adoptive parents. He had a febrile seizure at age 3 but not since this time. In childhood

he experienced sensory-integration issues and tantrums. He still was sensitive to smells, tastes, and textures but not as much as he once had been. His parents are aware of a sensitivity to dairy. When he was an infant he was sensitive to many formulas and had diarrhoea frequently. Dairy also worsened his chronic constipation.

B.K.'s parents are concerned with the seizures and the possibility that they are causing damage to B.K. internally. They also are very concerned about the worsening behavioural issues and the potential that B.K. will harm himself or someone else. Although he has not been diagnosed as such, his behaviour and other issues suggest he may be on the Autistic Spectrum. They are concerned with the high level of anxiety which he seems to be experiencing and that he does not seem comfortable in his 'own skin' at times.

B.K.'s father had spent a significant amount of time researching the possible issues which may be related to chronic PEG-based laxative exposure, and is a part of many parent's support groups on the internet surrounding this and other issues. His mother on the other hand has not spent much time in any medical research, and prefers to put her trust in the doctors who have been managing his case to date. However, they are both in agreement now that the chronic use of the PEG laxative was an inappropriate treatment for his constipation, and they also both are very concerned with the side effects of his current medication. His father has many supplements he would like to try with B.K. however his mother is very cautious and distrustful of supplementation.

B.K.'s father requests that we perform a urinary organic acid's test (OATs), and a comprehensive digestive stool analysis (CDSA) with parasitology is also recommended given the chronic digestive issues which B.K. has experienced.

First Supplement Programme	
Diet	**Avoid known triggers. Determine if other medications have PEG in them.**
Flax seed freshly ground	**1-2 Tbsp daily in smoothie**
Epsom salt	**¼ cup in bath routinely. Gradually increase to 2 cups.**
Magnesium, topical	**Use as tolerated**
Phospholipid Colostrum (ARG)	**½ scoop daily in small amount of liquid**
Broccoli sprout extract (sulforaphane)	**1 capsule daily, may mix with small amount of food**
Stramonium 12C or Hyoscyamus 12C (homeopathic)	**Try 7 pellets in water or under tongue when having episode.**

26.5.15

Since the last appointment, recommended testing of OATs and CDSA has been performed and results received. In addition B.K. had an overnight procedure at the hospital, intended to provoke seizure activity. This included withdrawal from the medication and sleep deprivation. He also happened to have Jello with dye in it at the hospital. The EEG showed left lobe activity of spikes which were indicated to be seizure activity. Testing was also done by their neurologist to assess liver function as valproic acid may have side effects of hepatotoxicity. High normal levels of asparatate aminotransferase (AST) and alanine aminotransferase (ALT) were found. Their neurologist has recommended switching B.K. to the drug Lamictal (Lamotrigine) or increasing the dosage of valproic acid, however when he was at a higher dosage behavioural issues were worse.

The parents have gradually started the broccoli sprout extract and colostrum after 15.5.15. Prior to this they made no changes as the EEG was to be performed. They had tried one of the homeopathic remedies when he was having a temper tantrum and felt it may have made things worse. They have been organising Epsom salt baths with a minimal amount of Epsom salt. The neurologist they have been working with will soon change and they are not happy about this, and may seek a second opinion.

B.K. is not in the office for this appointment. His parents report his behaviour has continued to regress. He has been throwing things more frequently, including throwing a phone at the wall. He also is chewing his cheek obsessively. He likes to be brushed. His anxiety appears to be at a breaking point, and he has been struggling to do math which he once was good at. He broke his glasses earlier that day when he was struggling with his math. He also has been swearing a lot. His parents state that his behaviour in the home is creating home "dis-ease."

Testing results are as follows, with recommendations and reasoning:

CDSA testing: Low levels of lactobacillus spp shown - none grown. Secretory IgA (sIgA) is elevated. In absence of abnormal flora or infection elevated sIgA is likely due to a food antigen that Bradley is responding to, but also can be elevated with stress particularly when 'frustration' is high. Low normal butyrate levels. Butyrate is a short chain fatty acid that promotes beneficial flora in the gut and facilitates numerous immune mechanisms associated with immunological tolerance; and is produced by lactobacillus from the metabolism of prebiotics (fibre). As levels of lactobacillus are very low this may be one reason butyrate levels also are low. Recommend supplementation with mixed strain lactobacillus spp at dosage of 20 - 25 bil colony forming units (CFU) daily. Supplementation with lactobacillus may improve butyrate levels; however, additional varieties of fibre will be beneficial. No pathogenic flora or fungal overgrowth found with testing.

OATS test:
Elevated Arabinose: High levels of arabinose may indicate yeast or fungal overgrowth OR may be elevated with consumption of apples, grapes, and pears.
Elevated Citric acid: High levels of may be due to intake of citric acid containing foods or intestinal yeast. High levels may inhibit citric acid cycle and deplete glutathione. As pyroglutamic acid values are also low normal supplementation to support glutathione is recommended.
Elevated Adipic acid: High levels may result from excessive ingestion of gelatine, bone broth, or junk foods with this as an additive. Also may indicate abnormal fatty acid metabolism, however as other ketone and fatty acid markers are not high this is not an issue. Supplements containing L-carnitine recommended. This was high previously as well.
3-hydroxy-3-methylclutaric levels are high for a child: may benefit from supplementation of antioxidants such as N-acetylcysteine (NAC) or coenzyme Q10 (CoQ10).
Low Ascorbic acid: May benefit from supplementation.
Low pyridoxic acid: May benefit from supplementation with B6.
Low normal values of N-acetylcysteine and pyroglutamic acid both may reflect low levels of glutathione in the body, a primary antioxidant.
Markers of mitochondrial function and methylation are normal and do not indicate a problem with these elements.

Diet is further discussed. PEG and PG are prolifically used as stabilisers and food texturisers in the food industry. It was recommended to switch all food purchases over to organic. In the organic industry ingredients that are sugar alcohols (mannitol, xylitol, sorbitol) are frequently used and also should be avoided. Some people with PEG and PG sensitivity have a reaction to these as well. It was recommended to look for recipes

and meal ideas on food blogs or websites with Paleo diet or Gut and Psychology Syndrome (GAPS) recipes for kids.

Nutrient depletions with associated with Valproic acid are also discussed, as it has been recommended that B.K. remain on this medication long term. A reference for the potential nutrient depletions can be found here: http://tinyurl.com/j3gy2xz. Dietary depletions with long term use that are important to support are folic acid (L-methylfolate or 6(S)-5-methyltetrahydrofolate [6(S)-5-MTHF]) form, niacin, L-carnitine, selenium, copper, zinc, vitamin D, and calcium (also important with low dairy intake).

Second Supplement Programme	
Flax seed freshly ground	**1-2 Tbsp daily in smoothie**
L-glutathione, diluted 6x,9x,30x,60x	**Add 20 - 30 drops to water bottle and drink ½ in AM and ½ in PM away from food 15 minutes.**
Epsom salt	**¼ cup in bath routinely. Gradually increase to 2 cups.**
Phospholipid Colostrum (ARG)	**Gradually increase to 1 scoop up to twice daily.**
Broccoli sprout extract (sulforaphane)	**Finish and do not continue**
Staphysagria 6C (homeopathic). Specific for anger behaviour which includes throwing	**Try 7 pellets in water or under tongue when having episode.**
Acetyl-L-carnitine (ARG)	**500mg/day – may open and mix in something**
Nordic Naturals Fish oil Gummies or ProOmega Jr	**Dose as specified for size on package.**
Lactobacillus Plantarum/Rhamnosus/Salivarius (ARG)	**1 capsule twice daily. May mix with food.**
Acetyl glutathione (ARG)	**½ tablet twice a day**

28.5.15

B.K.'s mother calls with concerns about some of the supplements he is taking. They have a new multivitamin to meet some of the nutritional deficiencies which may occur with valproic acid – Vitality Kids multi. She is concerned about the alcohol present in the L-glutathione dilution and if this will impact his liver function as his enzymes are already high normal. She also is worried that the colostrum may be constipating, and wondering why it is necessary if he is taking the probiotic.

It is recommended to start the Vitality Kids Multi at a dosage of 1 Tbsp/day rather than the 2 Tbsp indicated on the package. The small amount of alcohol present in the glutathione dilution when 20 drops are put in 8oz of water is not an issue for liver function, and will not be something that B.K. can even taste when it is diluted in a glass of water. Colostrum should not have a side effect of constipation, and is not the same as a homeopathic.

3.6.15

B.K.'s mother calls with additional concerns about the small amount (250mg) of glutamine in one of his supplements. Mother is assured that the small amount of glutamine is not a contraindication with the valproic acid and only serves to support enterocytes.

1.7.15

The probiotic appears to be helping a bit with the poor elimination and mild constipation that B.K. continues to experience.

B.K. continues to experience emotional outbursts but they have been less impulsive. He experiences regret when he has an episode that he cannot control. He cries more at these times. They are now also seeing signs of obsessive-compulsive behaviour such as methodical filling in of the dots of his handwritten i's or full stops. He becomes angry and frustrated if he goes outside of the line. His handwriting has also deteriorated. His math skills are also not as they were before the valproic acid, and he becomes frustrated and feels under pressure when doing things like mathematics flashcards. The behaviour of breaking his glasses has also not improved.

Supplement-wise, they have not yet started the fish oil as B.K. hates the smell and taste of fish. They have been most diligent with the probiotic. They did not start the acetyl-L-carnitine. They have been doing the glutathione dilution about half the time. They have been doing the colostrum a bit less than half what was recommended. They would like to start a product that B.K.'s father learned about on the Facebook group he is on called Restore4Life which is marketed to support gut health. They just got the acetyl-glutathione and have not started it yet.

In addition to supplementation food sensitivity testing is recommended.

Third Supplement Programme	
Flax seed freshly ground	**1-2 Tbsp daily in smoothie**
L-glutathione, diluted 6x,9x,30x,60x	**Add 20 - 30 drops to water bottle and drink ½ in AM and ½ in PM away from food 15 minutes.**
Epsom salt	**¼ cup in bath routinely. Gradually increase to 2 cups.**
Phospholipid Colostrum (ARG)	**Gradually increase to 1 scoop up to twice daily.**
Kid's Vitality Multi	**1 Tbsp/day with meal**
Vitamin D	**500 – 1000IU/day.**
Acetyl-L-carnitine (ARG)	**Ok to discontinue.**
Nordic Naturals Fish oil Gummies or ProOmega Jr	**At least 500mg combined EPA/DHA daily with a meal.**
Lactobacillus Plantarum/Rhamnosus/Salivarius (ARG)	**1 capsule twice daily. May mix with food.**
Acetyl glutathione (ARG)	**½ tablet twice a day**
Restore4Life	**10 drops once a day. Supports gut health (as does probiotic, vitamin D, colostrum).**

21.10.15

B.K.'s parents report that his obsessive-compulsive behaviour have been improving dramatically. He also has been seeing an occupational therapist who is helping him to understand how "his engine runs fast" and how his sensory issues contribute to his emotions, and how to control them and calm himself down when situations arise. He is much less confrontational – parents state this behaviour is within 10 – 20% of what it was before being on the seizure medications. Things have been going much better with his homework – activities that were taking up to 1.5h are now things he can accomplish in 10 minutes, and are no longer difficult for his

parents to get him to engage in either. He is back to being more independent and taking the bus to school as well as making it to his soccer practice.

Physical symptoms of a tummy ache occur at times when he has things that would make him anxious at school. His health overall has been good. Has a stool every day, and if they notice it is less than normal they make sure to get a smoothie with vegetables and some chia in him and then it improves. He usually has a stool at the end of the school day. Continues to have smell sensitivity – if mom puts something abnormal in his smoothie he won't eat it.

His valproic acid levels have not been monitored since January 2015. At this time, it was in a sub-therapeutic range, and was decreased to ½ the dosage at that time, and reduced even further in March 2015. There is an order in for testing of his levels. They do not have an appointment with a neurologist until March of 2016.

Supplements that B.K. has been continuing to do are colostrum, acetyl-glutathione, probiotic, Natural Vitality Multi all about half the time or half the amount recommended. Are not able to get him to take a fish oil due to the smell. They did not start the Restore4Life product because they are worried that when they do it will improve his gut integrity and his serum levels of the seizure medication will further fall. They are wondering if chia seeds are equivalent to the fish oil as essential fatty acids as B.K. refuses the fish oil.

His parents are overall very enthusiastic about the improvements in B.K.'s symptoms and behaviour.

Fourth Supplement Programme	
Flax seed freshly ground	**1-2 Tbsp daily in smoothie**
L-glutathione, diluted 6x,9x,30x,60x	**May discontinue.**
Natural Calm (magnesium)	**Dose as specified on package. Mix with warm liquid.**
Phospholipid Colostrum (ARG)	**1 scoop daily. May increase dosage to twice a day if others are sick – supports immunity.**
Kid's Vitality Multi	**1 Tbsp/day with meal**
Bio-D-mulsion (BRC)	**Vitamin D 400 – 800 IU/day.**
Barlean's Omega Swirl	**At least 500mg combined EPA/DHA daily with a meal. Variety of flavors available that do not have "fishy" taste.**
Lactobacillus Plantarum/Rhamnosus/Salivarius (ARG)	**1 capsule twice daily. May mix with food.**
Acetyl glutathione (ARG)	**½ tablet twice a day**
Restore4Life	**3 drops twice a day. Supports gut health (as does probiotic, vitamin D, colostrum).**
Liposomal Zen (ARG)	**2 squirts under tongue up to 3 times a day as needed for anxiety.**
Tummy Glycerite (Wise Women Herbals)	**1 dropper full for tummy ache and associated anxiety up to three times a day.**
Castor oil topically	**Apply to abdomen daily at night for constipation and relaxation and general digestive support.**

7.12.15

B.K.'s parents email with attempts to coordinate for a future visit and updates with symptoms and supplementation. They reported that his teacher stated "He is having an AWESOME morning. He is

participating, focused, and happy." They are interested in increasing the dosage of the Restore product which was started at a fairly low level due to concerns that it may affect the valproic acid levels. He recently had his valproic acid levels assess and it was found to be 40.8 mcg/mL while the therapeutic range is 50 – 125 mcg/mL. He has now been seizure free for 7 months despite the levels being below the therapeutic range. They are having troubles getting B.K. to take the colostrum still, which is somewhat not surprising as he has developed an aversion to dairy overall.

B.K.'s parents are grateful for the support and improvements they have seen in his overall health with support from a holistic perspective. Unfortunately, they were never able to schedule a follow-up, but with reports that things were going well and many patient referrals from B.K.'s father, it is assumed that things continue to go well with B.K. and their family.

Supplement Information

Phospholipid Colostrum (ARG)
Colostrum supports immune function, gastrointestinal mucosa. Phospholipid Colostrum's coating mimics the phospholipid coating of fresh, liquid colostrum, and it is made of the same kind of phospholipids found in our cell membranes, including those in the lining of the GI tract.

Broccoli sprout extract
Contains from 30 to 50 times the concentration of isothiocyanates as mature broccoli. 1,000 mcg of sulforaphane per capsule.

Restore4life (Biomic Sciences)
Purified water, a soil-based mineral supplement, Terrahydrite (Stabilized Lignite Extract), trace soil amino acids and minerals. Marketed to strengthen the gut lining and support the protection of the entire gastrointestinal tract.

Natural Calm Magnesium (Natural Vitality)
Magnesium citrate in powdered form to add to water. Ideal for kids as a liquid formula does not require taking of pills.

Acetyl-L-carnitine (ARG)
Acetyl-L-carnitine is involved in the metabolism of protein, carbohydrates and fats, as well as the conversion of fats into energy. Acetyl-L-carnitine crosses the blood brain barrier more readily than L-carnitine. It has antioxidant properties, and supports glutathione and CoQ10 levels.

Acetyl-glutathione (ARG)
Oral glutathione formulation that is stable in the stomach and gastrointestinal tract, well absorbed, and able to enter the cells directly and present to the cytosol for mitochondrial entry.

Lactobacillus Plantarum/Rhamnosus/Salivarius (ARG)
Three particularly hardy strains of the friendly probiotic bacteria lactobacillus. L. plantarum has very high lactase activity, and it can deliver and release lactase throughout the stomach and small intestine, facilitating the digestion of lactose.

L-glutathione, 6x,9x,30x,60x (Professional Complementary Health Formulas)

L-glutathione homeopathic dilution supports glutathione utilisation at a cellular level.

Omega Swirl (Barleans) and Fish oil gummies (Nordic Naturals)
Fish oil in formulations that are more agreeable for children and adults who dislike the "fish" taste and are not able to take gel capsules.

Bio-D-Mulsion (BRC)
Supplies vitamin D3 (400 IU per drop) in an emulsified form to aid in uptake and assimilation, especially important for those with malabsorption issues.

Liposomal Zen (ARG)
Advanced liposomal delivery form of GABA and L-theanine. Liposomal delivery system uses pure soy-free essential phospholipids from sunflower lecithin, for increased direct absorption.

Tummy Glycerite (Wise Women Herbals)
Matricaria recutita (chamomile), Melissa officinalis (lemon balm), Foeniculum vulgare (bitter fennel), fennel and lemon essential oils in a base of vegetable glycerin and spring water. Each of these herbs has both a southing digestive action and also acts as a nervine and is calming to the central nervous system. Made in glycerite form and ideal for children who experience digestive symptoms with anxiety.

Stramonium, Hyoscyamus, Staphysagria homeopathics (Boiron)
Notes on remedies directly from Blue Morrison Desktop guide:
Stramonium: The Stramonium child is often placid in the office showing little or none of the violence described by the parent. The troubles often begin after a strong fright such as a car accident, a sexual abuse, the witnessing of an act of violence in the environment, or after a neurological insult such as meningitis or encephalitis. The precipitating event is often followed by nightmares or terrible night-terrors and eventually the development of rages. The rage in Stramonium is uncontrolled and impulsive - that is, without malicious forethought. It comes in an outburst, almost as a convulsion or neurological discharge. It would be unusual for a Stramonium case to develop such a violence without equally strong fears.
Hyoscyamus: Hyoscyamus is one of our most important remedies in behaviour disorders of children, and there is a wide range of behaviour problems. The child may simply have poor control over his impulses - talking, joking, throwing tantrums at the most inappropriate times. There are often tremendous difficulties with other siblings; jealousy, provoking of fights and abuse. Cursing is a strong characteristic, often used especially for shock value by these provocative children. This remedy can have the same violence and aggression as Stramonium, but typical cases are more mild; thoughts and speech are more violent than actions.
Staphysagria: Staphysagria is most noted for suppression of anger. It is an important remedy in patients whose complaints originated from anger or insults which have been swallowed. Confrontation is very difficult for the patient. It is only in the late stages when the anger is finally too great to be suppressed, that the Staphysagria patient has really overt expression of anger. There can be outbursts of anger generally demonstrated by the marked, instinctive tendency to throw things - often in the direction of the offending party.

Discussion.

Strengths and limitations of this case report including case management

Strengths (and difficulties) in the management of this case were engaging 3 parties (mother, father, and son) to participate in protocols which all were not equally interested in. This involved supporting the mother in her

anxieties about treatments, supporting the father's enthusiasm and accepting his selection of supplements which he had researched, and finding supplements which the child was able and willing to take. With appropriate communication and research finding a common path which all would agree to was possible.

Limitations in this case from a provider perspective was the very slow and reluctant attitudes towards the use of supplements which were recommended. It made it difficult to move the case forward when the family would come in for a follow up and had not engaged in the recommended therapies. As supplements were recommended as treatments because of they were indicated for multiple reasons, when they were not utilised the main recommendations going forward was often just to encourage the family to engage in the recommended treatments. Another difficulty was working with the father's input, which was from a variety of non-educated sources on the internet. Some of the concepts and treatments which he was familiar with were correct, but required feedback and further guidance.

The literature relevant to this case report

There are many concerns that although the osmotic PEG-based laxative Miralax may lead to a variety of adverse effects in sensitive individuals. This laxative is considered a first-line therapy for functional constipation in children.[1] These reports are often from parents who have had children who were prescribed this laxative on an ongoing daily basis for the treatment and prevention of constipation. However, in published medical literature it has been documented as safe for use in paediatrics, even for long-term use.[2] It was recently disclosed by the Food and Drug Administration (F.D.A.) that potential toxins were discovered in batches and that there is little data on its absorption in children. The F.D.A. reported that they had tested eight batches of Miralax and found ethylene glycol (EG) and diethylene glycol (DEG), ingredients in antifreeze, in each of them.[3] These are impurities associated with the manufacturing process. Reports to the F.D.A. of tremors and obsessive-compulsive behaviour were the most common adverse events reported in the paediatric population with long-term use. PEG, attached to therapeutic moieties in a process known as pegylation, is also used in the pharmaceutical industry to reportedly improve circulation time and reduce immunogenicity of substances. However, recent medical literature also reports that the opposite may occur, and that the assays that were designed to assess for immunogenicity were flawed and lack specificity.[4]

Most children with epilepsy have an idiopathic disorder with a normal neurologic examination and neuroimaging studies. Most seizures occur at random and without warning. In contrast, many nonepileptic spells (which are often perceived as seizures) have characteristic precipitating circumstances or occur in specific locations. The electroencephalogram (EEG) is an important tool that is utilised to assess individuals with suspected seizures. The information from the EEG can be helpful in determining the type of seizure, as well as what type of anti-epileptic medication may be most helpful. There are several other limitations to the EEG including interpretation, difficulty in generation of events to provoke activity, and electrode placement. Large areas of the cortex (up to a few square centimetres) must be activated to generate activity which can be sensed by the electrodes.[5] EEGs of healthy children often contain similar activity to an individual with epilepsy. Studies have reported epileptiform activity in up to 6.5% of healthy children.[6] EEG abnormalities also may be seen in individuals with coeliac disease, and are improved by a gluten-free diet.[7] Atypical electrophysiological patterns and epilepsy are also more common in individuals on the autistic spectrum.[8,9] Interestingly, valproic acid is utilised to induce behaviours of autism in rats for studying this disorder.[10]

Supplements such as vitamin D and magnesium have been observed in animal studies to raise the seizure threshold.[11,12] There also is evidence that vitamin D deficiency is be associated with symptoms on the autistic spectrum, and that supplementation with vitamin D may improve symptoms.[13] Lower plasma levels of

magnesium have also been seen in children on the autistic spectrum, and magnesium in combination with pyridoxine (B6) have evidence for improving symptoms in this population.[14,15]

Increased oxidative stress has been reported in individuals on the autistic spectrum. Whether this is in part causative or related to other factors such as genetics or environmental toxins and toxic metal burden is unknown.[16,17] Significantly lower levels of glutathione, a primary antioxidant, have also been documented in this population. Supplementation with glutathione or agents to support glutathione such as N-acetylcysteine have been shown to improve glutathione status and may improve symptoms of irritability and obsessive compulsive behaviours.[18,19,20,21] Sulforaphane, found at high levels in broccoli sprout extract, has evidence for upregulating genes which improve antioxidant status, and has been shown to improve behaviours in individuals on the autistic spectrum.[22]

The rationale for your conclusions

There was no distinct conclusion drawn in this case, however a collection of natural therapies which have evidence for improving the variety of symptoms this individual experienced were found to be effective in improving his overall state, particularly the things which were most concerning to his parents and the medical community.

The main findings of this case report: What are the take-away messages?

Although a case may appear difficult and challenging from a medical perspective (seizure diagnosis with unknown aetiology and significant behavioural challenges), often very basic natural interventions can go a long way to support the restoration of balance and health.

Patient Perspective. The patient should share his or her experience or perspective of the care in a narrative that accompanies the case report whenever appropriate.

B.K.'s parents were very grateful for support for the restoration of their son's health with natural agents. The therapies provided were in line with concepts that made sense – testing to evaluate for documentable metabolic or gastrointestinal abnormalities, and evidence-based therapies to support healing of the digestive system which was a known contributor, as well as for reduction of anxiety and emotional outbursts.

Informed Consent.

The patient is not aware his case history is being used, and all identifiable data has been removed.

Case Report Submission Requirements for Authors

1. Competing interests.

None Known

2. Ethics Approval.

This case was not presented to an ethics committee.

3. De-Identification.

All patient data has been re-identified

4. Author.

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