

Planning of Ketogenic Diet – Case based approach



by
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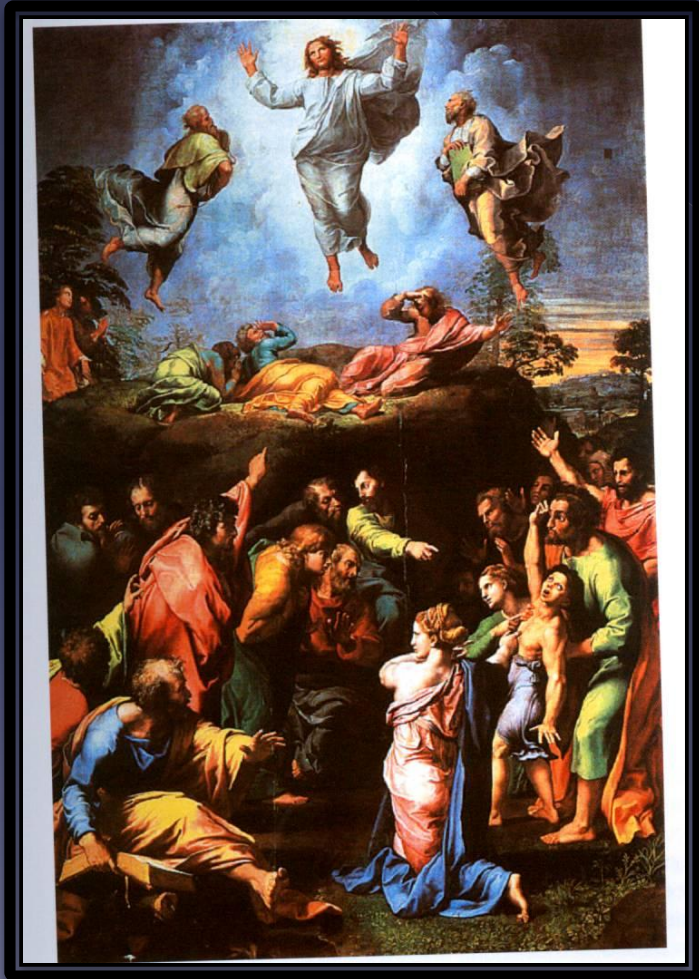
WHAT IS KETOGENIC DIET?

ketogenic diet is a diet which mimics the fasting state of body. It is high fat ,low CHO diet leads to ketosis which can control seizures

- HISTORY/ORIGIN
- HOW THE DIET WORKS ?
- INDIANIZATION OF THE DIET
- ADMINISTRATION OF THE DIET-CASE STUDY APPROACH
- DURATION OF THE DIET TREATMENT



Origin of ketogenic diet from Fasting



- The Bible: King James version
Mark 9: 14-29 (400 B.C.)
- he fell on the ground, and wallowed foaming
- Jesus took him by the hand, and lifted him up; and he arose”
- “And he said unto them, this kind can come forth by nothing, but by prayer and fasting”

Why fasting?

Fasting forces the body to burn stored body fat and Induce a continuous state of ketosis

Fat (In absence of glucose)



Ketone bodies (Acetoacetate, beta hydroxyl butyric acid, acetic acid)



Accumulating
in blood
(ketosis)



Excess is excrete
out in urine



This has an anticonvulsant effect , thereby inhibiting seizures

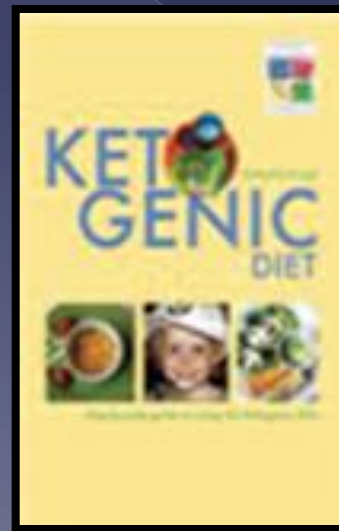
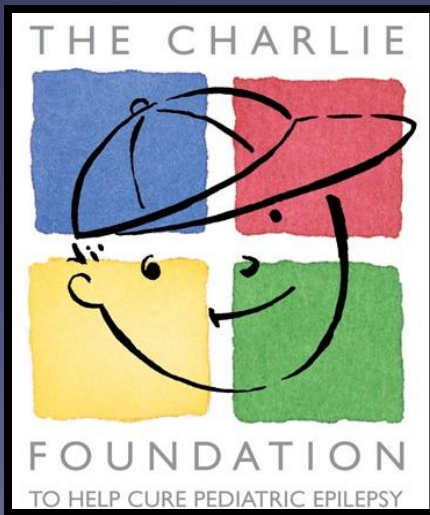
How diet works...some hypothesis

- Cerebral reserves increased by chronic ketosis
- Metabolism of glutamic acid alteration
- β hydroxybutyric acid may affect acetoacetate and acetone level in the brain and have anticonvulsant effect
- Calorie restriction shown to have anticonvulsant effect in animals when seizures are induced artificially
- KD elevates the level of nor epinephrine to have antiepileptic effect
- High fat leads to high PUFA levels which acts as modulators of neuronal hyperexcitability

Medical history of ketogenic diet

Year	Milestones
1921	American medical convention Dr Rawle Geyelin, pediatrician and Dr. Huge Conklin , Osteopath reported fasting as successful treatment for epilepsy
1921	Dr Wilder proposed that benefits of fasting could be obtained by other means – That is Diet Rich in Fats and low in CHO
1924	Dr Petermen from Mayo clinic Used 1 gm proteins per KG of IBW , CHO 10 to 15 gms/day and remaining calories from Fats diet and reported good results
1930	Dilantin a new anticonvulsant drug was introduced and attention turned towards medications instead of mechanism of action and efficacy of the diet
1993	Charlie Abraham got cured with the diet and his father Jim Abraham made the diet popular

CHARLIE'S STORY



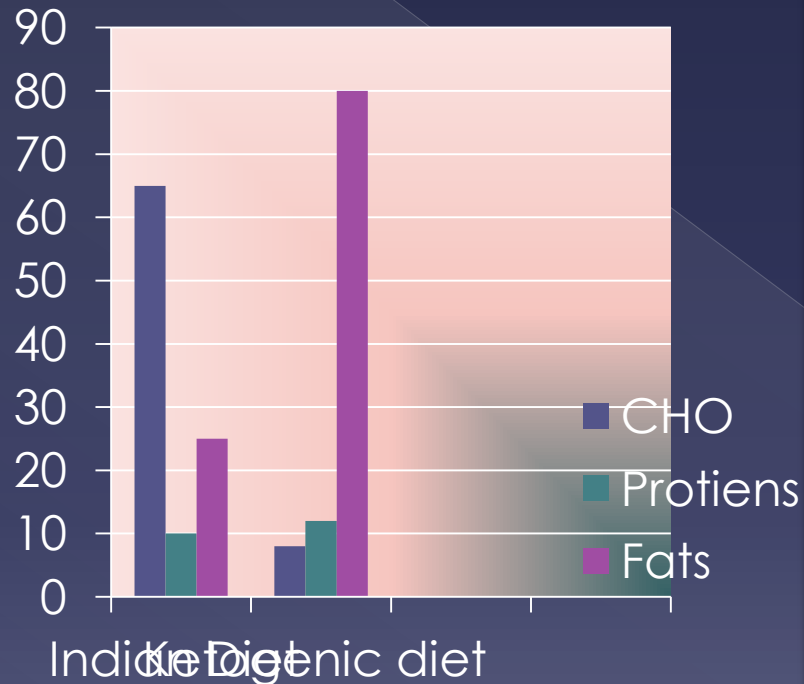
Reports from the Literature on Seizure control using the Ketogenic Diet

Author	Year	No of patients	SC more than 90%	SC 50-90%	SC LESS THAN 50%
Peterman	1925	36	51%	35%	23%
Helmholtz	1927	91	31%	23%	46%
Wilkins	1937	30	24%	21%	50%
Livingston	1954	300	43%	34%	22%
Kinsman	1992	58	29%	38%	33%
Huttenlocher (MCT)	1971	12	-	50%	50%
Siils ET al (MCT)	1986	50	21%	20%	26%

Indian Scenario

- Dr J. Nathan – First neurophysician to initiate Ketogenic diet in India in 1996 (328 patients in last 18 years)
- As per the available data the responder rate (more than 50% control) is 75.8% for infants, 66% for children, 100% for adolescents and 42.9% for adults.
- Over 90% reduction in seizures was seen in 51.6% infants, 36% Children ,33.3 % adolescents and 28.6 % adults
- In Pune under the guidance of Dr Surekha Rajdhyaksha Bharti Hospital has initiated Ketogenic diet from 2008 .
- Data will be published soon after the enough number of Patients .

STAPLE INDIAN DIET VS. KETOGENIC DIET



○ Ketogenic Diet – A challenge in India and Indian Experience

Problems with the CLASSICAL PROTOCOL adopted by John Hopkins

- Unpalatable American food
American recipes Eggs Benedicts, Cheese cake, Beef franks Steak with mushroom sauce.
- Culinary culture, food beliefs and myths
- Non labeling in Indian packaged foods and availability and standardization

Hopkins Ketogenic Diet Protocol

Hospital Admission for 5days

- Before the admission: CHO & fluid restriction
- DAY 1: FASTING & fluid restriction

KETOGENIC DIET

- DAY 2: 1/3 OF CALORIES as eggnog as dinner
- DAY 3: 2/3 OF CALORIES , eggnog for breakfast and lunch and dinner full meal as ketogenic
- DAY 4: FULL CALORIES- full ketogenic recipes
- DAY 5: full calories breakfast & DISCHARGE
- EDUCATION CLASSES EVERY DAY

Ketogenic Diet – A challenge in India and Indian Experience

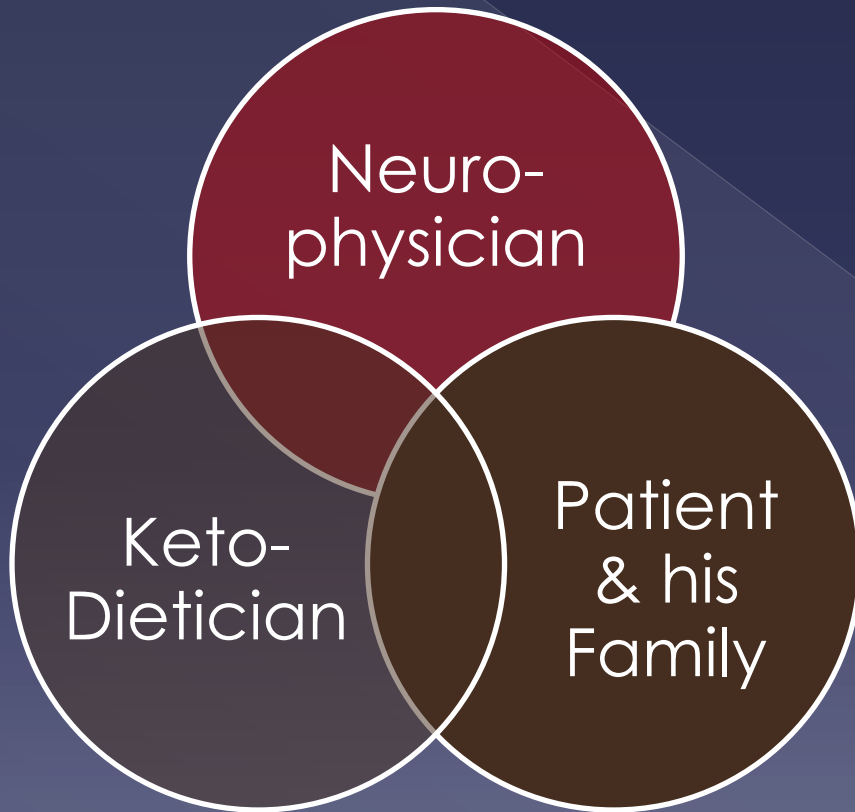
- Aversion to fasting
- Hospital admission and related expenses
- High initial keto ratio
- Solution to high cholesterol / triglyceride

Protocol used by us

PROGRAMME IN OUR CENTER

- **PHASE ONE-** Pre diet counseling & Investigations
- **PHASE TWO-** CHO wash out diet counseling
- **PHASE THREE-** Recipes counseling and explanation
- **PHASE FOUR -** Follow ups
- **NO** Hospital admissions and Fasting
- **Use of Lower ratio that allows more variety**

KetoDiet team Work



- **Neuro – physician**
Select the right candidate for diet
Medical mgt and related issues throughout the diet treatment
- **Keto dietician**
Pre diet counseling
Calculations
Recipe /meal planning and demo
Follow ups and fine tuning
Motivation and support

Case study presentation

- Phase One
- Pre diet counseling



First counseling



- Medical history of the patient is noted
- Diet history of the patient- ethnic background, Food habits (veg/non veg), likes/dislikes
- Food allergy if any
- Note down Age, height ,weight
- General information on ketogenic diet is given, history, rate of success, side effects and FAQs
- Investigations like keto profile and fresh EEG



Case Study: Patients information

- History – Rahul ,10 years old male with 1 st episode of convulsion at 8 th months of age unproved while playing in form of right focal sz lasted for 10 minutes , 2nd GTCS 15 days later for 5 mins , thereafter frequency increased for 2-3/day . Tegrital was started , Sz continued so clobazam and then valparin was added
- Speech delay
- Birth history normal
- EEG shows abnormal and showed multifocal epileptiform polyspike wave discharges over both the hemispheres mainly over both posterior regions along with frequent generalized asymmetrical burst of polyspike wave discharges
- Current medications**
 1. Topmac 25 mg 1-1-1
 2. Valparin 200 mg 1-1-1
 3. Clobazam 5 ma 1-1SZ Control – poor

Current height is 130 cms
Current weight is 27.5 kgs

Phase two – CHO washout diet

- Patient and parents were happy when we told no fasting and hospital admission
- On OPD basis ,Instead of fasting, CHO wash out diet was advised to achieve ketosis with in 2-3 days
Therefore foods containing mainly protein and fat are allowed
- Rahul is a non vegetarian patient so planning CHO wash out is easy
- NO calorie recommendations as the main goal is to get the maximum ketones , the amount is prescribed on the basis of his diet recall
- Emphasized on giving more fats in the diet and restricting the carbohydrates to 5 gms per day to achieve 4 + ketones as early as possible
- A list of products to be purchased was given

List of the items given that needs to be purchased

From chemist	From shop / mall – food items which are not used frequently at home	Other items from mall
Ketodiastix	Amul cheese/paneer	Nonstick pan
Sugarfree natura tablets or any sucralose	Amul cream	Rubber spatula
Multivitamins	Soyamilk	Fiber spoon
Calcium	Soya-rawa/Soya flour/soya-nuts	Weighing scale- 1 gm accuracy
Sugarfree tooth paste like Meswak or Vicco sugar free	Tofu	Measuring glass
	Essence/ color- liquid, gelatin	

Carbohydrate wash out foods

Unlimited	Limited	Free food
Soya rawa	Amul cheese /paneer 20 gms	sugar free drinks
Soya flour	cow milk 100 gms	sugar free soda
Soya nuts	tomato 1 medium	sugar free jelly
Ketokid	almonds or walnut 2	
Soya milk sugarfree	Amul cream 100 gms	
Chicken/Fish/eggs		
Fats and oils		

No sugar
 No cereals & pulses
 No vegetables/fruits except that is allowed



More on Soyabean

- The carbohydrates in soybean consist predominantly of non-starch polysaccharides (NSP) and free sugars, such as, mono-, di- and oligosaccharides (Choct, 1997).
- Most of the soybean CHO are in indigestible form
- Its important to use processed soyabean
- Its important to use Whole soyabean
- The dieticians should be well assured with the source of soyabean and it should be tested first on few patients for better assurance
- The quality and availability should be maintained by the manufacturer

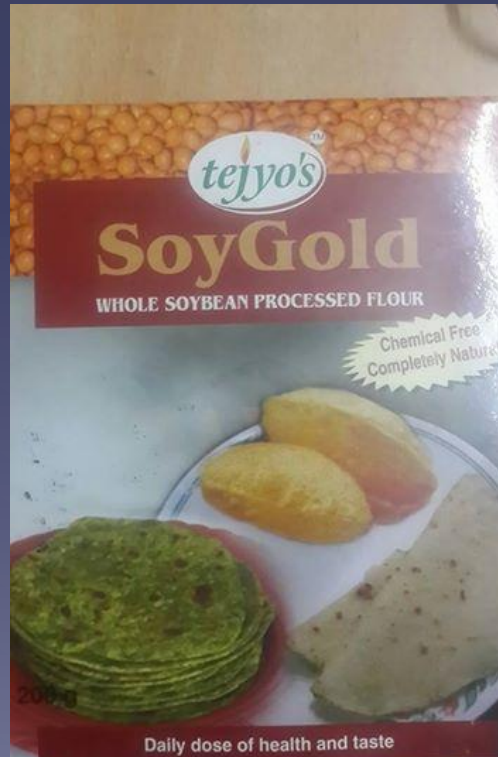
Sample menu- CHO wash out

Meal	Menu
Early morning	Soymilk unsweetened (Chetran or Steata) Add sugar free / essence
	Or ketokid powder in water
	Or Nusowin protein powder in water (add sugarefree / essence)
Breakfast	Boiled egg / egg omelet (add lots of oil/ghee/butter)
	Or soya suji with extra oil
	Or sweet soya suji
	Or Tofu stir fry or Tofu bhurji
Midmorning	Sugar free drink with water or Soda and essence , color and sweetener
	Or 2 to 3 almonds or walnut
	Or cheese cube 1 no
	Or soya nuts handful /Chicken or meat soup

Sample menu - CHO wash out

Meal	Menu
Lunch	Soya suji
	Or chicken fried or Fish fired
	Or Chicken pulao or Fish Pulao with soya granules
Evening	Soymilk unsweetened (Chetran or Steata) Add sugarfree / essence
	Or ketokid powder in water
	Or Nusowin protein powder in water (add sugarefree / essence)
Dinner	Soya suji
	Or chicken fried or Fish fired
	Or Chicken pulao or Fish Pulao with soya granules

CHO wash out foods



Other instructions given

- Eat after every 2 to 3 hours
- Add Maximum fats or oil possible to each recipe
- Cut chicken and fish into small pieces and fry them
- Make butter toffees adding sweetener and essence
- Advised them about start checking urinary ketones – after explaining how to check urine ketones and give urine ketone chart to note down the ketones

Urinary ketone chart

Check urine for ketones daily 4 times and Note down the levels



CHO wash out/Ratio	Date	morning	noon	evening	Night	No of fits/ Any other problems
CHO washout	27/7/14	trace	1 +	2 +	3+	5
	28/7/14	4+	4++	4++	4++	2
1600 (2:1)	29/7/14	2 +	3+	4+	4++	0
	30/7/14	3+	4++	4+	3+	1

Phase 3 – calculating the diet

- First step is to determine the calories for Rahul
- The calories given is 75% of RDA as per age
- To determine the calories we calculated IBW as per ICMR chart, 3 days recall , activity level(He was moderately active)
- is 10 yrs old
- Current height is 130 cms
- Current weight is 27.5 kgs
- IBW is 26.67 as per 50 th percentiles
- Total calories per day is 26.67×60 (75% RDA for age) = 1600 /day

Phase 3- calculating the diet

- Second step – decide the ketogenic ratio and calculate the dietary unit composition
- Ketogenic ratio is the ratio of amount of fats to the amount of CHO and proteins together
- After the fasting period the Ketogenic diet is initiated with 4: ratio as per the original protocol
- For Overweight patients -3: 1 to allow burn their own body fats
- Infants and teen agers -3:1 to allow more proteins
- If MCT oil is given then ratio can be reduced 3:1 as MCT oil is more ketogenic

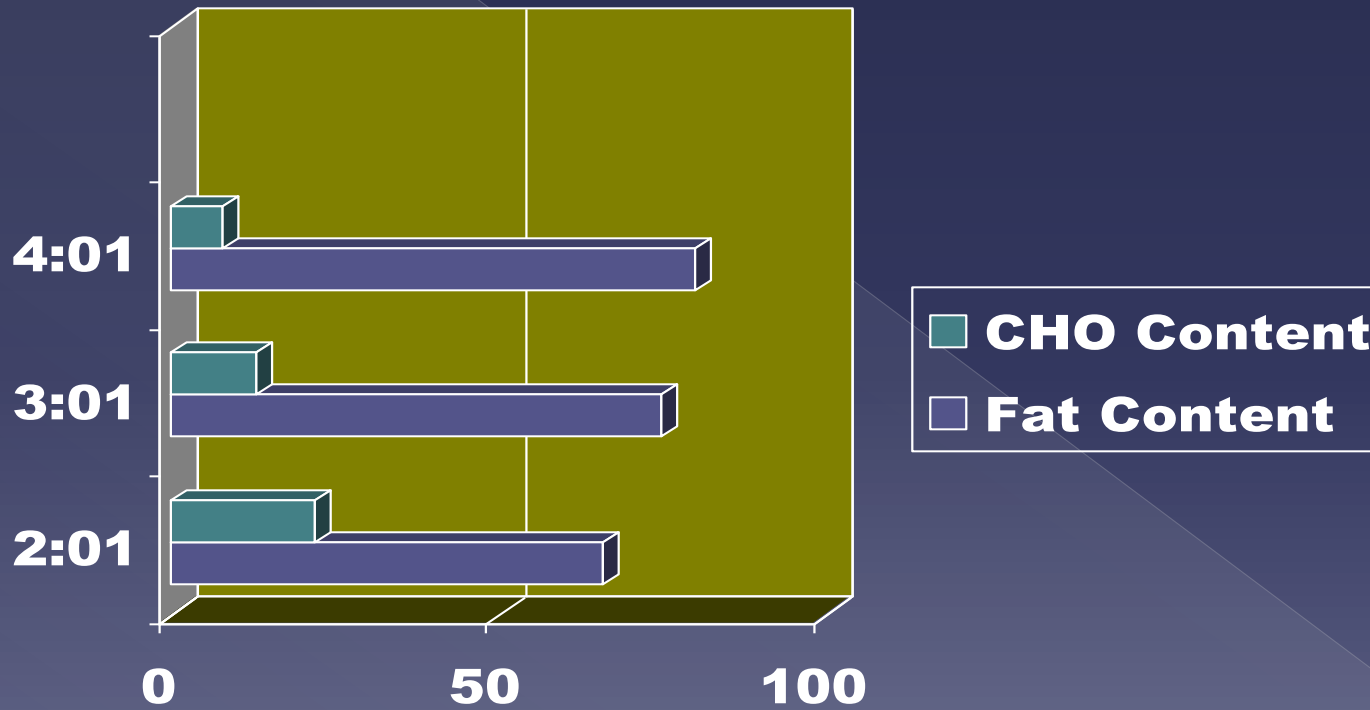
- However in our center the diet started with ketogenic ratio of 2:1 which permits more variety and palatability

Phase 3- calculating the diet

- Second step – decide the ketogenic ratio and calculate the dietary unit composition
- How to determine Dietary Unit composition

Ratio	Units of fats	Fats gives 9 kcals	Units of CHO and proteins	CHO +Pr gives 4 kcals	Total DAC
4:1	4	$4 \times 9 = 36$	1	$1 \times 4 = 4$	40
3:1	3	$3 \times 9 = 27$	1	$1 \times 4 = 4$	31
2:1	2	$2 \times 9 = 18$	1	$1 \times 4 = 4$	22

Ketogenic Ratios



Phase 3- calculating the diet

Second step – decide the ketogenic ratio and find out the dietary unit composition

- So for Rahul the initial ketogenic ratio decided was 2:1
2:1 ratio = 2 gms of fats to 1 gm of protein + carbohydrate (combined)
- 2 x 9 kcal of fats (18)
- 1x4 kcal of CHO + proteins combined (4)
- Therefore $18 + 4 = 22$ that is called dietary units composition
- **The Dietary units composition here is 22**

Phase 3- calculating the diet

- Third Step is to find out DUQ (dietary unit Quantity)
- The total allotted calories(1600) divided by Dietary Unit composition(22)

$$1600/22 = 72.72$$

Dietary unit quantity is 72.72

Phase 3- calculating the diet

- Fourth step is to decide the daily allowance of fats, Cho and proteins for Rahul
- A. Decide the total amount of fat
FAT ALLOWANCE/DAY
DUQ x 2 (since ketoratio is 2)
Is $72.72 \times 2 = 145.45$ gms of fats /day
FAT ALLOWANCE/DAY = 145.45 gms of fats /day
- B. Decide the total amount of CHO and proteins together
CHO + PROTEINS /DAY
DUQ X 1 (CHO+ PROTEINS) Is $72.72 \times 1 = 72.72$ gm **Total**
CHO + proteins = 72.72 gm/day

Phase 3- calculating the diet

- C. Decide the total protein requirement

- **PROTEIN ALLOWANCE**

- is 1 gm/kg IBW so for IBW of 26.67 the total proteins is 27 gms/day

- **D. CHO ALLOWANCE**

Total CHO + proteins – total protein

$$= 72.72 - 27 = 45.72 \text{ gm. CHO day}$$

Phase 3- calculating the diet

- Fifth step is to write down the meal order
- DIVIDE THE TOTAL ALLOWNCE INTO EQUAL PORTIONS OF MEALS (As per 4 meals/day)

Nutrients	Per Day	Per meal
Fats	145.45	36.36
Proteins	27	6.75
CHO	45.72	11.43

Phase 3- calculating the diet recipes

- Next is to translate this into actual recipes
- For this you need
 - Nutritive value /100 g of commonly used food items in ketogenic diet and a calculator
 - OR Keto calculator or EKM (Electronic keto manager)
- Information on locally available food items, commercial powders and its availability , cost factor need to be taken into consideration while planning the recipes ,
- patients diet history, likes and allergies should be considered while calculating the recipes


List of food items that can be used in KD

Fats and oil seeds	Protein foods	Carbs	Commercial powders	Free food
Ghee	Soya flour	Vegetables	Ketokid	Water
Butter	Soy suji	Fruits	Nusowin	Sugarfree
Oil	Soya granules	Pulses	Nutralite	Salt
Coconut	Soya nuts	Cereals	Pure MCT powder	Spices
Groundnut	Cheese	Oats	chicken powder	Gelatin
dry fruits	Paneer	Bran	Egg powder	Essence
Flax seeds	Tofu	Corn		Flavors
Til seeds	Chicken	Chickoo		Soda
Coconut milk/cow milk	Eggs	Banana		
Cream	Fish	Green peas		
Sunflower seeds	Soyamilk	Potato		

What recipes can be made?

Vegetarian	Non vegetarian	Sweets	Snacks
Palak paneer	Butter chicken	Dudhi halwa	Soya upma
Paneer makhnwala	Fish curry	Icecreams	Onion bhujia
Cream of tomato soup	Egg omelet	Milk shakes	pizza
Tofu masala	Fish curry	Chocolates	Creamy mushrooms
Pithale	Chicken soup	Cookies	Kothimbir wadi
Mung daal soup	Chicken veg salad	Soya sheera	patra
Vegetable stir fry	Chicken mayonnaise	Edible gum kheer	Chewada
Baked vegetable with cheese	Egg bhurji	Fruit jelly	Makhana fry

Meal one – Makhana kheer

Food item	Amt	CHO	Proteins	Fats
Makhana	8 gms	5.12	1.37	0.19
Cow milk	100 gms	4.4	3.2	4.1
Almond	9 gms	0.94	1.87	5.3
Amul cream	25 gms	0.75	0.5	6.25
Ghee	21	-	-	21
Or butter	26			
Total		11.21	6.94	36.84
				
	36.84		18.15	2

Meal two – chicken TikKa with cream of Veg soup and salad

Food	Amt	CHO	proteins	Fats
Chicken	11 gms	--	2.58	0.08
Curd	50 gms	2.2	1.6	2.05
Fresh ginger	2 gms	0.24	0.04	0.01
Coriander leaves	6 gms	0.37	0.19	-
Carrot	30 gms	2.4	0.6	-
Tomato	40 gms	1.6	0.4	
Cabbage	30 gms	2.4	0.6	-
Amul cream	25 gms	0.75	0.5	6.25
Ghee/oil	28 gms			28
Cucumber	37 gms	1.48	0.37	
Total		11.44	6.88	36.39

Other Instructions

- Fluid Restriction – 1 ml/kcal, one can adjust the fluids per the climatic changes
- Vegetable and fruit exchanges are given
- Weighing Instruction- weighing scale
- How to weigh different food items
- Cooking instructions/Recipe Demo
- Nonstick pan/ spatula fiber and rubber
- Use different types of oils
- PUFA:MUFA:SFA
- 1:2:1
- Supplements



Phase 4- Fine tuning & Follow up – most important

- The main objective of the diet is to achieve and maintain the ketone levels to achieve optimal seizure control
- **Check for the following for better ketones**
- Check for hidden carbs in the diet and medicines, check for mannitol, maltose, lactose in food, check for any change in commercial brands,
- Check for extra food at school/friends, wrong weighing methods, infection
- Weight – maintaining IBW/ gaining/ losing – calorie adjustments, as ketones are well maintained in IBW
- increase the ratio,
- As far as possible, make one change at a time
- 6 month commitment in order to give a fair chance to fine tuning phase

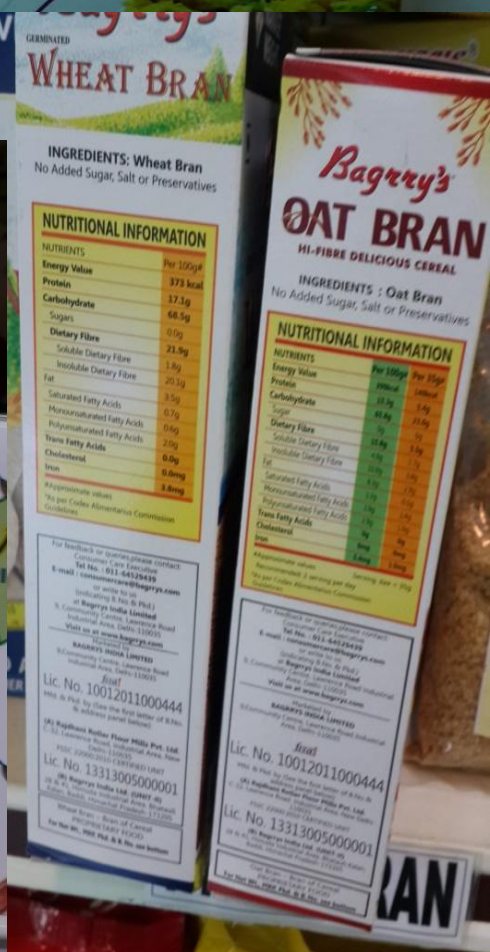
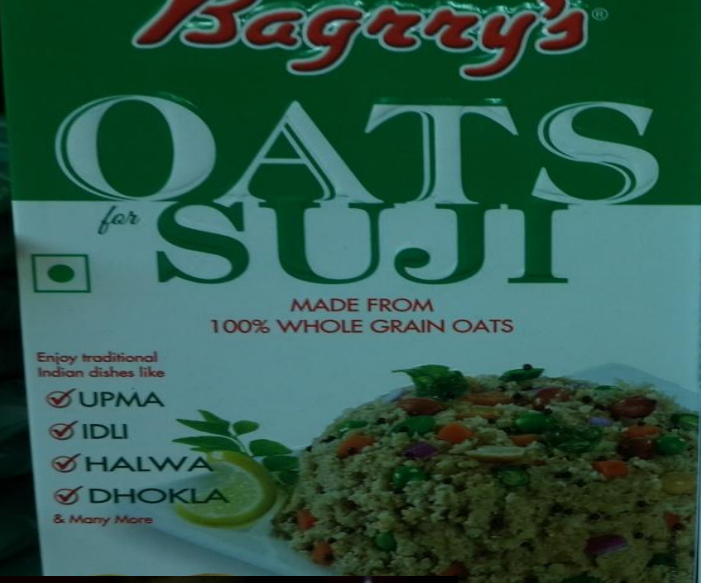
Follow ups



- High ketosis
- If ketones are very high that is 4 ++ (The dark colour is seen immediately)
- Loss of appetite, starts vomiting , feels drowsy he may be facing deep ketosis issues.
- This can be solved with giving 30 ml orange juice/sweet lime juice without sugar
- If persists lower the ratio

Follow ups

- Other things need to be reviewed
- Like appetite, recipes, meal timings, no of meals, digestion,
- Liquid intake and frequency of urine
- No of seizures , frequency and intensity
- Change in medicines
- Checking of the weighing scale
- Urine routine advised and checked during follow ups
- Any other issues



INGREDIENTS: Wheat Bran
No Added Sugar, Salt or Preservatives

NUTRITIONAL INFORMATION	
NUTRIENTS	Per 100g*
Energy Value	373 kcal
Protein	17.1g
Carbohydrate	68.5g
Sugars	0.0g
Dietary Fibre	21.5g
Soluble Dietary Fibre	1.8g
Insoluble Dietary Fibre	20.3g
Fat	3.5g
Saturated Fatty Acids	0.7g
Monounsaturated Fatty Acids	0.0g
Polysaturated Fatty Acids	2.8g
Trans Fatty Acids	0.0g
Cholesterol	0.0mg
Iron	3.8mg

*As per Codex Alimentarius Commission Guidelines

INGREDIENTS: Oat Bran
No Added Sugar, Salt or Preservatives

NUTRITIONAL INFORMATION		
NUTRIENTS	Per 100g*	Per 30g**
Energy Value	390 kcal	117 kcal
Protein	14.0g	4.2g
Carbohydrate	61.0g	18.3g
Sugars	0.0g	0.0g
Dietary Fibre	19.0g	5.7g
Soluble Dietary Fibre	1.5g	0.4g
Insoluble Dietary Fibre	17.5g	5.3g
Fat	3.0g	0.9g
Saturated Fatty Acids	1.0g	0.3g
Monounsaturated Fatty Acids	1.0g	0.3g
Polysaturated Fatty Acids	1.0g	0.3g
Trans Fatty Acids	0.0g	0.0g
Cholesterol	0.0mg	0.0mg
Iron	3.8mg	1.1mg

*As per Codex Alimentarius Commission Guidelines

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Free food



Rahul's progress on diet

- He started on 2 : 1 ratio
- Since his ketone levels used to be low he gradually shifted to 3: 1 ratio
- Then added with 10 ml MCT or coconut oil /day
- Now settled on 3: 1 Ratio stopped MCT as maintaining ketones without them
- Earlier 2 to 3 fits per day now 2-3 per month so more than 90 % control
- Positive changes in behavior and understanding
- Not much change in medicines yet
- Tried to taper one drug but started getting more sz so back to the same drug

Case study-Modified Atkins Diet

- Akansha – age 6 years From poor socio economic family No marriage in relation, No any family history of epilepsy.

Full term baby delivered with 3.1 kg wt. Approx. 15-20 sec delayed cried.

Day 3rd of life Lt. Focal convulsion.

Hospitalized diagnosis was

Hypocalcaemia treated.

Up to 10th month all the mile stones were normal

Case study-Modified Atkins Diet

GTC at 10th month changed all the symptoms.

At the 10th month baby landed in status epileptics followed by Lt Upper limb monoparasis

At the age of 10 months episodes were 24,25 minutes

Today she is having little drop attacks & small 10/20 sec Lt . focal attacks.

Tab. Topamac 25 mg BD,

- Tab. Nitrovest 5mg BD,

- Syp. Valparine 3ml BD.

- EEG – the Record is grossly abnormal . It shows generalized epileptic discharges suggestive of burst separation pattern with mild asymmetry of activity seen over Rt hemisphere

Modified Atkins diet protocol

- Carbohydrates described in detail and restricted to 10 g/d for the first month (increase to 15 gms afterwards as per the ketones)
- Fats (eg cream, oils, butter, mayonnaise) encouraged Clear, carbohydrate-free fluids not restricted
- multivitamin and calcium supplementation prescribed
- Check urine ketones twice a week and weight weekly
- Complete blood count, complete metabolic profile, urine calcium and urine creatinine, urinalysis, and fasting lipid profile at baseline, 3 months, and 6 months

Carbohydrate allowance 15 gms /day

Food groups	amount	carbs
Vegetable A-	100 gms	4 gms
Vegetable B	100 gms	8 gms
Fruit A	100 gms	10 gms
Fruit B	100 gms	15 gms
Milk cow	100 gms	4 gms
cheese	100 gms,	6 gms
almond	10 gms	1 gm
Coconut fresh	10 gms	1 gm
cashewnuts	10 gms	2 gms
walnut	10 gms	1gm
Dry coconut	10 gms	3 gms
Amul cream	100 gms	3 gms
Amul paneer	100 gms	7 gms
Nusowin	10 gms	1 gm
Amway nutralite	10 gms	1 gm
MACADAMIA NUTS	10 gms	1 gms
groundnut	10 gm	2 gms

RT plan for ketogenic diet

Arjun Chudhary	11/3/14	
Weight 15	DOB-12/4/10	
Ht- 98 cms	Calories requires -1100/day	
IBW - 14.4	Proteins - 23.67 gms/day	
R T feeds 6 times a day		
1. Soyapowder with MCT powder	2.MCT and Neusowin	3. Ketokid with milk
Soyapowder 10 gms	MCT powder 5 gms	Ketokid 20 gms
MCT powder (5 gms)	Nusowin 5gms	Cow milk 15 gms
Refined oil 15 gms	Refined oil 15 gms	Soyapowder 1 gms
Add water if required		Oil 5 gms
Salt a pinch		

TPN and ketogenic diet

- Not much information available but Can be considered
- Lipid emulsions containing MCT oil is more useful in producing ketones
- If lipid emulsions contain any glycerol then it needed to be calculated as carbohydrates
- Enteral feed should be administered as soon as possible as long term TPN can cause liver damage
- Selenium and carnitine supplementations necessary

Side effects of KD

Short term Side effects	Treatment
Dehydration (particularly if initial fast)	Plain water, soda with sugar free tablet, lemon juice can be given
Hypoglycemia	10-20ml sugar free orange juice can be given
Nausea/vomiting	Sucking of ice cubes, Plain soda with flavours (sugarfree) before and after meals can reduce this problem
Constipation	Adequate fluid intake and inclusion of vegetables
Hyperuricemia	Include soy in diet as a vegetable source of protein, drink adequate water
Long term side effect	Treatment
Loss of bone density	Adequate intake of calcium & vitamin D
Growth retardation	Adequate protein intake
Renal stones	Adequate fluid intake & potassium intake
Hyperlipidemia	Use combination of oil (Olive, Mustard & saturated fat), use soybean oil due to its hypocholesteremic effect
Nutritional deficiency (Iron deficiency anaemia)	Include supplements of vitamins & minerals

To Summarize.....

- Ketogenic diet is very effective alternative therapy when medicines do not work
- Cost factor is one of the limitation as it involves expensive food like ghee, oil, chicken, fish cream paneer and cost of ketodiastix, medicines etc
- Trained and dedicated keto dieticians can play a major role in the success of Diet
- New technology like EKM for faster calculations, mobile, emails, what's app to share nutritive values of new food should be used for constant support
- Multicenter studies will help to analyze more data on efficacy of diet is necessary

Ketogenic food



Thank you !

