NUTRITIONAL MANAGEMENT OF CHYLOTHORAX

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• Nutrition therapy plays a major role in the conservative treatment of chyle leaks.

• Loss of this protein-rich, calorie-rich fluid can cause complications including dehydration, malnutrition and immuno suppression.
CASE SCENARIO

9 month male child who is a K/C/O CHD – large VSD + PDA
H/o birth asphyxia, brief neonatal ventilation & persistant stridor

Clinical history
Cyanosis : Nil
Clubbing : Nil
Icterus : Nil
Temperature : 102°F
Pulse : 106/min
BP: 98/48mm Hg
CVS: S1, S2 Present, systolic murmer present

Surgery : VSD + PDA Division
Anthropometry

Admission weight : 7.2 Kg
Admission height : 72.2cm
Head circumference : 40 cm
% Weight for height : 78 %

Wasting (Mild)

% Height for age : 99%
BMI for age percentile : <3rd percentile
Diet history : DBM + Weaning diet

Nutrition related diagnosis - Acute Malnutrition
NUTRITIONAL REQUIREMENT

Estimated by catch up Growth formula
Calorie needs – DRI for energy x Ideal wt for ht (kg) 
Actual wt (kg)

Protein needs – DRI Protein for age x Ideal wt for ht (kg) 
Actual wt (kg)

DRI – Dietary Reference Intake

Required Calories : 736 k.cal
Required Protein : 15 gm

Ref:- Manual of Pediatric Nutrition by Hendricks & Duggan
## Post Operative Diet

<table>
<thead>
<tr>
<th>POD</th>
<th>Feeding Route</th>
<th>Diet Prescribed</th>
<th>Calories (Kcals)</th>
<th>Protein (gm)</th>
<th>Fat (gm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>NBM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2 - 3</td>
<td>Central line</td>
<td>TPN @ 12ml/hr</td>
<td>581</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Day 4 - 5</td>
<td>Central line</td>
<td>TPN @ 15ml/hr</td>
<td>758</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>Day 6</td>
<td>PN + NG</td>
<td>TPN @ 10 ml/hr</td>
<td>494</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>RTF@15ml/hr</td>
<td>266</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>760</td>
<td>15</td>
<td>18</td>
</tr>
</tbody>
</table>
### POST OPERATIVE DIET

<table>
<thead>
<tr>
<th>POD</th>
<th>FEEDING ROUTE</th>
<th>DIET PRESCRIBED</th>
<th>CALORIES (Kcals)</th>
<th>PROTEIN (gm)</th>
<th>FAT (gm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 7</td>
<td>NG</td>
<td>RTF@ 24ml/hr</td>
<td>425</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Day 8</td>
<td>Chyle leak was detected. Pleural fluid TGL – 363 mg/dl</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Medical Nutrition Therapy

Focuses on restriction of dietary long-chain triglycerides while correcting other nutrient deficiencies

Goals

- Decrease production of chyle fluid
- Replace fluid and electrolytes
- Maintain or replete nutritional status and prevent malnutrition
<table>
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<th>PROTEIN (gm)</th>
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<tbody>
<tr>
<td>Day 8</td>
<td>NG</td>
<td>RTF @ 24ml/hr 90% MCT</td>
<td>449</td>
<td>9.6</td>
</tr>
<tr>
<td>Day 9-10</td>
<td>NG</td>
<td>RTF @ 30 ml/hr 90% MCT</td>
<td>509</td>
<td>12</td>
</tr>
<tr>
<td>Day 11</td>
<td>ORAL</td>
<td>MCT Based Liquid diet</td>
<td>484</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chyle leak resolved Chest drainage tube removed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 12 - 13</td>
<td>Oral</td>
<td>MCT Based semisolid diet</td>
<td>580</td>
<td>12</td>
</tr>
</tbody>
</table>
Day 14- Discharge

Diet : MCT Based semisolid diet

Calorie - 100kcal / kg
Protein - 2gm/kg day

Review after 1 week
Weight : 7.5 kg
Diet advised : Semisolid Diet

On follow up (After 2 months)
Weight : 9.3 Kg
Height : 73 cm
Nutritional status :
Well nourished
Incorporating MCT into the Diet: A CHALLENGE

- Sip or eat slowly
- Start with small volume. Taken as small “shots”
- Flavourings can be added.
- Add to a fat free beverage of choice.
- Consider diluting with equal volume of water or other fat free hot cereals, mashed potatoes, vegetables, applesauce etc.
Things to remember

• Virtually impossible to remove all fat from the diet. Many fruits, vegetables and even “fat free” products contain traces of fat.

• Coconut oil and MCT are not the same, as only 66% of coconut oil is MCT—the rest is long chain fat.

• MCT is available as MCT oil and contain 100ml -780kcal

• Fat-soluble vitamins and EFA may need to be supplemented.
NUTRITIONAL MANAGEMENT OF CHYLOTHORAX IN CARDIO THORACIC INTENSIVE CARE UNIT

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Clinical Dietetics¹, Critical care²
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Chennai
India

UNPUBLISHED DATA
OBJECTIVE:
Our observational study attempts to reveal the best options for the nutritional care plan for chyle leak.

METHODOLOGY
Patients who had chyle leak after cardiac surgery were included.

Parameters Includes -
- Anthropometry
- Biochemical
- Chyle leak volume
- Post Operative Day - Chyle detected and stopped
- Diet plan were analysed until progress towards resolution
Various nutritional strategies were applied in the management of Chylothorax in the cardiothoracic intensive care unit of our centre

- Exclusive Medium Chain Triglyceride (MCT) feeds (90% and 60%)
- MCT feeds (90% and 60%) with fat free diet
RESULTS

DISTRIBUTION BASED ON SEX

- Males: 13
- Females: 10

DISTRIBUTION BASED ON AGE

- < 6 months: 9
- 6 months-1 year: 2
- 1-3 years: 5
- 4-6 years: 2
- 10-12 years: 5
DISTRIBUTION BASED ON DIAGNOSIS

Chyle leak was predominant in Cyanotic heart disease subjects than Acyanotic heart disease subjects.
Distribution based on Nutritional status

![Distribution chart showing the number of cases of Wasting and Wasting & Stunting. There are 13 cases of Wasting and 10 cases of Wasting & Stunting.]

**Legend:**
- Wasting
- Wasting & Stunting
### Composition of MCT products

<table>
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<tr>
<th>NUTRITIONAL INFORMATION (per 100gms)</th>
<th>90% MCT FEED</th>
<th>70% MCT</th>
<th>68% MCT FEED</th>
<th>60% MCT FEED (NOT AVAILABLE)</th>
<th>48% MCT</th>
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<tbody>
<tr>
<td>Energy (Kcals)</td>
<td>424</td>
<td>475</td>
<td>465</td>
<td>464</td>
<td>463</td>
</tr>
<tr>
<td>Protein (gms)</td>
<td>11.4</td>
<td>14.25</td>
<td>17.5</td>
<td>13</td>
<td>12.9</td>
</tr>
<tr>
<td>Fat (gms)</td>
<td>11.8</td>
<td>18.5</td>
<td>17.4</td>
<td>16.9</td>
<td>16.5</td>
</tr>
<tr>
<td>Osmolality (mOsm/kg0)</td>
<td>250</td>
<td>420</td>
<td>360</td>
<td>312</td>
<td>370</td>
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</tr>
<tr>
<td>MCT</td>
<td>10.6</td>
<td>12.95</td>
<td>12.2</td>
<td>10.5</td>
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90% MCT feeds
90% MCT feeds + fat free diet
60% MCT feeds
60% MCT feeds + fat free diet

- 90% MCT feeds
- 90% MCT feeds + fat free diet
- 60% MCT feeds
- 60% MCT feeds + fat free diet
Number of patients with octreotide

- 90% MCT: 1
- 60% MCT: 5
- 60% MCT + fat free diet: 2
MEAN VOLUME OF CHYLE

Mean volume of chyle

- 90% MCT feeds: 110
- 90% MCT feeds + Fat free diet: 130
- 60% MCT feeds: 146
- 60% MCT feeds + Fat free diet: 165

- with octeotride
- without octeotride
COMPARISON BETWEEN 90% & 60% MCT FEEDS

**Duration of Drainage**

- **90% MCT feeds**: 5
- **60% MCT feeds**: 6

**Duration of Drainage**

- **90% MCT feeds + fat free diet**: 5
- **60% MCT feeds + fat free diet**: 8
Comparing the duration of chyle leak between 90 % MCT and 60 % MCT feeds.
MCT is a vital adjunct for the treatment of Chylothorax in post operative cardiac patients.

Ideally a 90% MCT seem to resolve the condition faster than lesser concentration (60% MCT).

Due to non-availability in India / Cost constrain of importing 90% MCT feed, 60 - 70% MCT can be used as it has a significant impact in the course of the illness.
THANK YOU