AMERICAN HEART ASSOCIATION 2012

- Several studies found higher blood levels of B vitamins are related to lower homocysteine levels.

- Also - low blood levels of folic acid are linked with a higher risk of fatal coronary heart disease and stroke.
HOMOCYSTEINE - FOLATE

- IN BOTH SEXES - DIETARY FOLATE DECREASED TOTAL HOMOCYSTEINE LEVELS

- 66 SUBJECTS AGED 18-45 YEARS - CONSUMED HIGH FOLATE DIET OF VEGETABLES AND CITRUS FRUITS
HOMOCYSTEINE - FOLATE

- NEED TO DECREASE LEVELS DOWN TO 9 OR 10 umol/L

- DIET IS UNLIKELY TO INCREASE CIRCULATING FOLATE LEVELS ENOUGH, THEREFORE, SUPPLEMENTS ARE NECESSARY
  - HAVE GREATER BIOAVAILABILITY THAN DIETARY FOLATE
HOMOCYSTEINE - FOLATE

• 1 mg/day OF FOLIC ACID HAS BEEN SHOWN TO BE BENEFICIAL
• EXACT DOSE UNKNOWN
• RANGE OF 0.5-5.7mg/day MAY PRODUCE A 25% REDUCTION IN HOMOCYSTEINE LEVELS
TREATMENT TO LOWER HOMOCYSTEINE

• **B6** 10mg/day NO EXACT DOSE KNOWN
• **B12** 4mg/day
• **FOLATE** 2-4mg/day
• IF PATIENT DOESN’T RESPOND TO THESE - NEED TO GIVE:
  – LOW PROTEIN DIET
  – LOW METHIONINE DIET
• IT IS STILL UNKNOWN WHETHER LOWERING HOMOCYSTEINE LEVELS WILL REDUCE OR REVERSE ATHEROSCLEROSIS DUE TO BOTH POSITIVE AND NEGATIVE DATA
CHOLESTEROL

• 70% IS MADE BY THE BODY IN THE LIVER
• FROM DIET - EGGS, ORGAN MEATS AND SATURATED FATS
• CAN BE INCREASED FROM LIVER DISEASE
• LDL - MAJOR CHOLESTEROL CARRYING LIPOPROTEIN IN PLASMA
• AS LDL INCREASES – SO DOES RISK OF DEVELOPING CVD (NOW DEBATABLE)
• STRONGEST DIETARY FACTORS OF ELEVATED LDL CHOLESTEROL - DIETARY SATURATED FAT AND TRANS FAT INTAKES

• TRANS FATS INCREASE LDL SLIGHTLY LESS THAN SATURATED FATS

• SATURATED FATS INCREASE HDL
HDL CHOLESTEROL

• HDL IS INVERSELY ASSOCIATED WITH THE RISK OF DEVELOPING CVD AND DIRECTLY PROTECTS AGAINST THE DEVELOPMENT OF ATHEROSCLEROSIS

• DUE TO REVERSE TRANSPORT OF CHOLESTEROL FROM THE PERIPHERAL TISSUES TO THE LIVER FOR SUBSEQUENT METABOLISM OR EXCRETION
• ONLY 25% OF THE POPULATION IS SENSITIVE TO DIETARY CHOLESTEROL AND HAVE SIGNIFICANT INCREASES IN SERUM CHOLESTEROL LEVELS DUE TO INCREASED DIETARY CHOLESTEROL
CHOLESTEROL RISK

• >256mg/dl HAVE A 5x GREATER RISK OF DEVELOPING CORONARY ARTERY DISEASE THAN THOSE WHOSE LEVELS ARE BELOW 220mg/dl
RISK FOR FATAL HEART ATTACKS

- 182-202: 29% INCREASE IN MI
- 203-220: 73% INCREASE IN MI
- 221-244: 121% INCREASE IN MI
- >245: 242% INCREASE IN MI

FOR FATAL MYOCARDIAL INFARCTIONS
QUESTION

• WHAT ARE THE NORMAL TOTAL CHOLESTEROL LEVELS OF A MIDDLE AGED PERSON?
NORMAL TOTAL SERUM CHOLESTEROL LEVELS

• <200mg/dl DESIREABLE
• 200-239 BORDERLINE
• >240 HIGH RISK
QUESTION

• LOW TOTAL CHOLESTEROL LEVELS BELOW 100mg/dl CAN BE INDICATIVE OF WHAT ABNORMALITIES?
ANSWER

• IF <100mg/dl
  – MAY BE DUE TO PROTEIN DEFICIENCY
  – OR INDICATIVE OF CANCER PROCESS
    (DECREASED MEMBRANE INTEGRITY AND IMMUNE FUNCTION)
BENEFIT OF TOTAL CHOLESTEROL REDUCTION

• WITH A 1% DECREASE IN TOTAL CHOLESTEROL, INCIDENCE OF HEART DISEASE DECREASES BY 2%
NORMAL HDL CHOLESTEROL LEVELS

- <35 mg/dL  RISK FACTOR
- >60 mg/dL  NEGATIVE RISK FACTOR

- <50 mg/dL IN WOMEN AND <40 mg/dL IN MEN IS ONE OF THE CRITERIA FOR METABOLIC SYNDROME
QUESTION

• WHAT ARE THE NORMAL LDL-CHOLESTEROL LEVELS OF A MIDDLE AGED PERSON?
LDL

- < 70 mg/dl IDEAL FOR PEOPLE AT VERY HIGH RISK FOR HEART DISEASE
- < 100 mg/dl IDEAL FOR PEOPLE AT RISK FOR HEART DISEASE
- 100 - 129 mg/dl NEAR IDEAL
- 130 - 159 mg/dl BORDERLINE HIGH
- 160 - 189 mg/dl HIGH
- 190 mg/dl VERY HIGH
• YOU ARE CONSIDERED HIGH RISH FOR HEART DISEASE IF YOU HAVE OR HAVE HAD ANY OF THE FOLLOWING:
  • PREVIOUS HEART ATTACK OR STROKE
  • ARTERY BLOCKAGES IN THE NECK (carotid artery disease)
  • ARTERY BLOCKAGES IN THE ARMS OR LEGS (peripheral artery disease)
  • DIABETES
IN ADDITION - TWO OR MORE OF THE FOLLOWING RISK FACTORS PUT SOMEONE IN THE VERY HIGH RISK GROUP:

- SMOKING
- HIGH BLOOD PRESSURE
- LOW HDL CHOLESTEROL
- FAMILY HISTORY OF EARLY HEART DISEASE
- BEING OLDER THAN 45 IF YOU ARE MALE OR OLDER THAN 55 IF A FEMALE
- ELEVATED LIPOPROTEIN(a)
TRIGLYCERIDES

• < 150 mg/dl DESIREABLE
• 150 – 199 mg/dl BORDERLINE
• 200 – 499 mg/dl HIGH
• 500+ mg/dl VERY HIGH
• THE AMERICAN HEART ASSOCIATION RECOMMENDS OPTIONAL IS 100 mg/dL OR LOWER
CHOLESTEROL/HDL RATIO

• WHICH PATIENT IS BETTER OFF?
• PT 1 - TOTAL CHOL 230   HDL 63
• PT 2 - TOTAL CHOL 212   HDL 46
ANSWER

- PT 1 - 3.65
- PT 2 - 4.60
- WANT RATIO BELOW 3.5 - 4.5
- LESS RISK FOR HEART DISEASE
- DEBATE OVER THE EXACT RATIO AS WELL AS IF THE RATIO IS MORE IMPORTANT THAN THE TOTAL-C??
IS CHOLESTEROL REALLY A PROBLEM AT ALL?

• DEBATABLE
• SOME BELIEVE CHOLESTEROL IS A MAJOR RISK FACTOR FOR CVD
• SOME BELIEVE CHOLESTEROL IS A MINOR RISK FACTOR FOR CVD
• SOME BELIEVE THE PROBLEM IS THE OXIDATION OF CHOLESTEROL RATHER THAN THE CHOLESTEROL ITSELF
• SOME BELIEVE CHOLESTEROL IS NOT A RISK FACTOR – IT IS INFLAMMATION
• INJURY ➔ INFLAMMATION ➔ BLOOD VESSEL CONSTRUCTION, BLOOD THICKENING AND TRIGGERING CELLS TO REPAIR THE DAMAGE
• LEADS TO VASCULAR PLAQUES AND A HIGHER RISK OF HEART DISEASE AND HEART ATTACKS
CHOLESTEROL - FATS

• THE EFFECTS OF INCREASING DIETARY CHOLESTEROL APPEARS DEPENDENT UPON THE POLYUNSATURATED FATTY ACID /SATURATED FATTY ACID RATIO

• AS RATIO INCREASES - IMPACT OF DIETARY CHOLESTEROL DECREASES
PLATELETS - FATS

• SATURATED FATS INCREASE PLATELET AGGREGATION WHILE UNSATURATED FATS DECREASE IT (ANTI INFLAMMATORY PATHWAYS)

• SATURATED FATS ARE MORE CLOSELY RELATED TO CLOTTING ACTIVITY OF PLATELETS THAN IS SERUM CHOLESTEROL
ATHEROSCLEROSIS THERAPY

- ONLY EFFECTIVE TREATMENT IS PREVENTION BY DIET AND LIFESTYLE
- FIRST LINE OF TREATMENT - DIET THERAPY (WITH EXERCISE AND WEIGHT CONTROL)
- IF NOT EFFECTIVE - DRUG THERAPY ADDED TO DIET THERAPY
DIET THERAPY - FISH

- CONSUMPTION OF FISH IS INVERSELY ASSOCIATED WITH CORONARY HEART DISEASE MORTALITY
- ALSO - ALL CAUSE MORTALITY REDUCED BY 29% IN ONE STUDY
• MEAT EATERS HAVE A 300% INCREASE IN RISK FOR CORONARY ARTERY DISEASE COMPARED TO FISH EATERS
• DEATH DUE TO HEART DISEASE IS 50% LOWER AMONG PEOPLE WHO EAT 30g OF FISH PER DAY COMPARED TO THOSE WHO EAT MEAT DAILY
FATTY FISH

• CONTAINS HIGH LEVELS OF OMEGA 3 FATTY ACIDS
  – EICOSAPENTANOIC ACID
  – DOCOSAHEXAENOIC ACID
• INHIBITS PLATELET AGGREGATION
• LOWERS SERUM TRIGLYCERIDES
• SHOULD BE COLD WATER FATTY FISH - SALMON, HERRING, TUNA, SARDINES, MACKEREL, PILCHARD, etc

• NON - FATTY FISH (COD, PLAICE) HAS LITTLE TO NO EFFECT
  - DUE TO LOW LEVELS OF OMEGA 3 FATTY ACIDS
SERVINGS

• 2x/week (30g each day) OR,
• FOUR 3 OUNCE SERVINGS PER WEEK
• NO GREATER BENEFIT UNTIL GET OVER 150g PER DAY OF INTAKE
• 15 GRAMS OF FATTY FISH PROVIDES 400mg OF OMEGA 3 FATTY ACIDS
• VEGETARIANS AND FISH EATERS HAVE A LOWER INCIDENCE OF CORNARY HEART DISEASE AND LOWER CHOLESTEROL LEVELS
LOW FAT DIET

• REDUCING TOTAL FAT CALORIES WILL REDUCE TOTAL PLASMA CHOLESTEROL IN MOST PEOPLE

• HOWEVER, LOW FAT DIETS (<30%) CAN STILL INCREASE RISK OF CARDIOVASCULAR DISEASE IF THE FAT IS PRIMARILY SATURATED

• WHY?
• BECAUSE LOW FAT DIET - REDUCES HDL CHOLESTEROL AS WELL AS THE TOTAL FAT
• NEED TO HAVE A LOW FAT DIET WITH HIGHER AMOUNTS OF MONOUNSATURATED FATS - THESE DO NOT LOWER HDL CHOLESTEROL
• RECOMMEND 20%-25% TOTAL FAT
HIGH FIBER DIET

- BINDS BILE AND CHOLESTEROL IN THE INTESTINE AND PROMOTE THEIR EXCRETION
- WATER SOLUBLE FIBERS MOST BENEFICIAL
  - PSYLLIUM - GUAR GUM - BEANS - OAT BRAN - LEGUMES - FRUIT PECTIN
PSYLLIIUM SUPPLEMENT DOSE

• THE SEEDS OR HUSKS 1-2 TEASPOONS A FEW TIMES PER DAY WITH WATER
• EXTRA WATER NEEDED THROUGHOUT THE DAY
• LOWERS TOTAL CHOLESTEROL, TRIGLYCERIDES AND LDL-Cholesterol
• INCREASES HDL