

Review Article

Fish eating: why and how of it

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Abstract

The concepts in the pathogenesis of atherosclerosis have evolved over time. Cholesterol and lipoprotein components have an established role and effective therapies are available to lower LDL-cholesterol and triglycerides. HDL-cholesterol targeted therapies are few and riddled with side-effects. However, life-style management and dietary factors play an important role in management of atherosclerosis and prevention of atherosclerotic complications. Diet rich in omega-3 fatty acids has been reported to have a beneficial effect on the lipid profile. Fish are a natural source of omega-3 fatty acids and are beneficial for prevention of atherosclerosis progression. However, bony fish may be troublesome for those not used to eating fish.

Key words: Fishes; airway obstruction; fatty acids.

Introduction and Background

There has been remarkable evolution in concepts pertaining to the pathogenesis of atherosclerosis from the early view that arteries were mechanical tubes/conduit. With the better understanding of vascular biology, it is known that the arterial wall is very much a dynamic tissue. A process that tends to commence in second decade of life, progresses relentlessly over the subsequent decades of life. Though it may appear silent, the complications of catastrophic nature such as acute myocardial infarction, unstable angina, cerebrovascular stroke may occur suddenly and some events can even turn fatal. Prevention of thrombotic events and measures to stabilise the plaque (to reduce disruptions) that may result into clinical events/death have been matters of concern in the recent times. The development of atherosclerosis is differential in different vascular beds- coronary, cerebral vascular and peripheral. Two of the common conditions: Hypertension and diabetes mellitus accelerate the tempo of the atherosclerotic process and may lead to premature vascular events mentioned above with accompanying mortality and morbidity in the form of disability. Racial, ethnic, behavioural (smoking) and lifestyle factors (excessive calorie

intake/physical inactivity/obesity) contribute to the extended severity of the process and are important components of "The Metabolic Syndrome".

Hypertension control and glycaemic control, both play an important role in the overall management of metabolic syndrome. Dyslipidemia has been one of the important culprits in the process and events. Elevated LDL-cholesterol [1] alone has been the principle lipid abnormality in most patients. However, low levels of HDL-cholesterol with/without elevated triglycerides have been other parameters for clinical/therapeutic attention. The rationale for the treatment of elevated LDL-cholesterol is well established and statin therapy remains the cornerstone for reducing CAD risks [2]. The magnitude of patient's lipid abnormalities, particularly low HDL-cholesterol is substantial and this calls for necessity of the combination therapy [3] of statin plus either niacin or fibrates. Isolated hypertriglyceridemia or in combination with high LDL-cholesterol/low HDL-cholesterol (combined hyperlipidemia) is observed in several diabetic patients more so in the south Asian context [4].

Looking at the above, it is evident that

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atherosclerosis and attendant vascular clinical disease needs to be tackled by multipronged strategies. Broadly, increased surveillance for the metabolic syndrome which is a cluster [5] of glucose intolerance, hyperinsulinemia, hypertriglyceridemia, low HDL levels, hypofibrinolysis, hypertension, microalbuminuria, predominance of small dense LDL and central obesity, is necessary.

Stoppage of smoking, regular exercise has been adequately emphasised. The role of diet and nutrition is very important.

Cholesterol absorption inhibitors like ezetimibe (10 mg/day) can be used as an addition in patients with LDL-cholesterol levels above target on maximally tolerated dose. Fibrates (fenofibrate 200 mg/day) is used to treat hypertriglyceridemia and combined hyperlipoproteinemia. Nicotinic acid (niacin) (1.5 to 2 g/day) is particularly effective in increasing HDL-cholesterol levels and lowering triglycerides levels, with the probable worsening of glycemic control and possibility of hot flushes.

Fish oils with rich content of fatty acids such as eicosapentaenoic acid and docosahexaenoic acid have potential applications in three situations-

- a) Dyslipidemia where hypertriglyceridemia is a component of the abnormal lipid profile, more so when it is severe/refractory.

Fish oils are rich in polyunsaturated fatty acids such as eicosapentaenoic acid and docosahexaenoic acid and lower the plasma triglyceride levels and possess antithrombotic properties. They increase the VLDL synthesis and decrease VLDL apoB. For a significant benefit to be achieved, the daily intake of 10 to 15 g is required. Their use is generally reserved for severe hypertriglyceridemia refractory to conventional therapy.

Supplements also could be a component of medical management of hypertriglyceridemia, a setting in which even larger doses (2 to 4 g/day) is required. The availability of high quality omega-3 fatty acid supplements free of contaminants is an important prerequisite for their use.

- b) As an agent to cut down the cardiovascular risk,

in addition to other measures.

There is evidence that consumption of fish, especially those with high content of omega-3 fatty acids confers protection from ischaemic heart disease [6] and that this relationship is particularly strong for coronary heart disease mortality and sudden cardiac death, which has been reported to be on average 52% lower in men consuming fish atleast once weekly versus men consuming less [7].

Though fish may have nutritive qualities, the major cardiovascular benefit is due to their content of the omega-3 fatty acids, eicosapentaenoic acids (EPA) and docosahexaenoic acid (DHA); increased plasma levels of these fatty acids may help predict a considerable reduction in sudden cardiac death.

A report indicated that intake of 5.5 g/month of EPA + DHA (equivalent to 1 portion of fatty fish per week) was associated with 50% lower incidents of primary cardiac arrest compared with individuals consuming no fish [8]. The effect is related/attributed to enrichment of membrane phospholipids with omega-3 fatty acids and resulting reduction in risk for abnormal cardiac electrical conductivity. The other probable properties of these fatty acids that may benefit risk for CHD are anti-platelets and anti-inflammatory effect, as well as reduction in plasma triglycerides at higher doses [6]. The AHA [9] has recommended consumption of two portions of fish per week, particularly those rich in omega-3 fatty acids (mackerel, herring, sardine, salmon).

- c) In patients with established ischaemic heart disease, clinical trials have supported evidence from epidemiological studies that higher intake of fish may be particularly beneficial in patients with CHD. In GISSI [10], secondary prevention trial, a supplement containing a total of 0.85 g per day of EPA and DHA resulted in reductions of 45% and 30% in sudden cardiovascular death. Total mortality and sudden death were reduced after three and four months of treatment respectively, consistent with reduction of arrhythmia by the treatment.

Based on the overall evidence to date, the AHA has recommended that supplemental EPA + DHA at doses upto 1 g/day [6] may be considered for risk reduction in CHD patients .

Other dietary / drug measures

Other than antiplatelet effects of omega-3 fatty acids, there is little indication of dietary effects of thrombosis. The glyceridemic effects of carbohydrates tend to correlate with their glycemic effects [11].

Consumption of atleast 5 portions per day of a variety of fruits and vegetables is recommended for maintaining cardiovascular health [9,12], whole grain and fibre, legumes (peas, beans, soya beans, lentils), nuts (walnuts, almond) [13].

Elevated plasma homocysteine levels modestly increase risk of cardiovascular disease and stroke. Folic acid, pyridoxine and cyanocobalamin (vitamins B6 and B12) can provide a basis for recommendation of supplementation of vitamin therapy in high risk individuals. Vitamin E 600mg, Vitamin C 250mg and Vitamin beta-carotene 20mg have also been studied in Heart Protection Study.

The how of eating fish

In Indian context the socio-cultural patterns are different and diverse. For those who are averse to fish consumption, medication in the form of capsule is available. The dosage however needs to be adequate (5 to 10 capsules) per day for optimal therapeutic effect to be obtained. Minor belching and after-taste are the effects observed on both short term and long term consumption.

Fish can be consumed as part of usual life style. For health reasons stated above, they need to be rich in omega fatty acids mentioned earlier.

It is important to remember on recommendation of fish consumption that the manner and method of the same is also an important consideration. Frying, deep frying, repetitive frying may neutralise the benefits that are expected to accrue.

The side effects of fish consumption include allergy, gastrointestinal upsets, food poisoning and host of symptoms if contained with metal/industrial pollution. Foreign body in throat [14,15] by bony fish is a dreaded event, sometimes even fatal.

For those who are regular fish-eaters, tackling bony fish while eating is not a problem, but those who are not adept at it may face tremendous difficulty and a number of medical emergencies can occur because of obstruction by the bone.

History of recent swallowing of fish preparation and experiencing foreign body sensation (often painfully) when swallowing is a suggestive presentation. The patient is convinced that there is bone stuck in the throat; if localised even vaguely above thyroid cartilage (implying foreign body in hypo pharynx), the clinician might be able to see it. If the patient localises the foreign body sensation in suprasternal notch, it implies that the foreign body is anywhere in oesophagus. If foreign body is in the bronchial tree it evokes coughing and wheezing. The obstruction at oesophagus produces drooling/spitting up of whatever is swallowed. The obstruction in crico-pharynx produces acute cough, choking, dysphagia and vomiting. The laryngo-pharyngeal foreign body has been commonly described, with fish bone being very common in children over ten years and adults. General management is emergency removal with laryngoscope, oesophagoscope, bronchoscope under anaesthesia as required in the given clinical situation. Remnant check is necessary.

Unlike in past, suggestions and recommendations on “how to eat whole fish (Asian style), how to eat fish on the bone, how to eat fish with bones (Indian fish recipes)” are now available on net (e.how.com). However a wise dictum would be, do not eat fish bone in the first place.

Thus it is crucial to know why and how of fish eating for obtaining optimal cardiovascular health benefit but preventing any complication thereof.

Key Points

- Lipid disturbances are one of the most important atherosclerotic risk factors.
- Fish eating is considered to be beneficial because of its high content of omega-3 unsaturated fatty acids.
- However, fish-eating for those who are not habituated, can be fraught with dangers like allergy, gastrointestinal upsets, food poisoning and foreign body obstruction in throat.

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