FROM ABSTRACT

Markov chain analysis, including sensitivity analysis, was used with a hypothetical population resembling that of Olmsted County, MN, aged 30 to 84 in the year 2000 to compare the estimated impact of three interventions to prevent sudden death:

1) Raising blood levels of omega-3 fatty acids.
2) Distributing automated external defibrillators (AEDs).
3) Implanting cardioverter defibrillators (ICDs) in appropriate candidates.

Results
Raising median omega-3 fatty acid levels would be expected to lower total mortality by 6.4% (range 1.6% to 10.3%).

Distributing automated external defibrillators would be expected to lower total mortality by 0.8% (0.2% to 1.3%).

Implanting Cardioverter Defibrillators would be expected to lower total mortality by 3.3% (0.6% to 8.7%).

Three fourths of the reduction in total mortality due to omega-3 fatty acid augmentation would accrue from raising omega-3 fatty acid levels in the healthy population.

Conclusions
Based on central values of candidacy and efficacy, raising omega-3 fatty acid levels would have about eight times the impact of distributing automated external defibrillators and two times the impact of implanting Cardioverter Defibrillators.

Raising omega-3 fatty acid levels would also reduce rates of sudden death among the subpopulation that does not qualify for implanting Cardioverter Defibrillators.

THESE AUTHORS ALSO NOTE:

“Sudden death due to cardiac disease imposes a significant burden on the population of the United States.”
“Half a million people die suddenly each year, and, for half of these people, sudden death is the first indication that they have coronary heart disease.”

Prevention and treatment of sudden death currently focuses on three interventions:

1) Implantable cardioverter defibrillators (ICDs).
2) Automated external defibrillators.
3) Consumption of omega-3 fatty acids.

A meta-analysis commissioned by the Agency for Healthcare Research and Quality concluded that “consumption of omega-3s, fish, and fish oil reduces all-cause mortality and various cardiovascular disease (CVD) outcomes such as sudden death, death from cardiac disease, and nonfatal myocardial infarction (MI).”

“The predominant effect of high omega-3 consumption is a reduction in risk of sudden death.”

The main outcome used in this study was mortality (death).

Studies conclude that “increasing omega-3 consumption reduces total mortality and sudden death in primary prevention.”

RESULTS

**Omega-3 Fatty Acid Scenario**

Raising blood omega-3 levels would reduce death by 6.4% (1.6% to 10.3%).

**Automated External Defibrillators Scenario**

Automated External Defibrillator use would reduce death by 0.8% (0.2% to 1.3%).

**Implanting Cardioverter Defibrillators Scenario**

Implanting Cardioverter Defibrillator use would reduce death by 3.3% (0.6% to 8.7%).

DISCUSSION and CONCLUSIONS

The results of this analysis indicate that “increasing blood omega-3 levels would reduce total mortality by 6.4%.”

“The omega-3 effect would be eight times as large as one produced by implementing an Automated External Defibrillators strategy that placed devices in all public areas and all homes and would be twice as large as implementing a strategy that implanted implanting Cardioverter Defibrillators in all individuals.” [Key]
“About three fourths of the reduction in deaths from the omega-3 strategy would accrue from increasing omega-3 levels in apparently healthy individuals, a group not normally the target of interventions to reduce the burden of sudden death.” [Very Important]

Despite the fact that Automated External Defibrillators do save lives, they are unlikely to ever have a substantial impact on rates of sudden death because there is a chain of events that must occur if an individual is to survive an out-of-hospital cardiac arrest:
1) The arrest must be witnessed by a bystander.
2) The rhythm must be ventricular fibrillation or ventricular tachycardia when the Automated External Defibrillator is applied.
3) The individual must survive to hospital admission.
4) Once in the hospital, the individual must survive to discharge.

“The leaders of the Public-Access Defibrillation trial suggest that implementing a nationwide public-access defibrillation policy would save 2000 to 4000 lives per year,” which is less than 1% of sudden deaths and only 0.16% of all deaths in the United States.

“The potential impact of implanting Cardioverter Defibrillators is mitigated by the fact that half of the individuals who suffer an out-of-hospital cardiac arrest have no history of cardiac disease and thus would not be candidates for an implanting Cardioverter Defibrillators before they sustained their cardiac arrest.” [Important]

“The number of deaths prevented by omega-3s in the healthy subpopulation could be nearly three times the number of deaths prevented by implanting Cardioverter Defibrillators and Automated External Defibrillators.”

“The American Heart Association and the American College of Cardiology have endorsed increased omega-3 intake by individuals who are apparently healthy, and recent quantitative analysis has concluded that increasing fish consumption would have a large net positive impact on public health.”

A single Automated External Defibrillators costs about $3000.00; the cost of placing such a device in all households is astronomical. The life of an Automated External Defibrillators is about 10 years before they need to be replaced. Training and Automated External Defibrillators maintenance costs are additional expenses.

The lifetime cost of an implanting Cardioverter Defibrillators is between $68,000 and $101,000.

Omega-3 supplements can be purchased for as little as $0.16/1000 mg.
“If increasing omega-3 intake is indeed the efficacious primary prevention strategy that it appears to be in cohort studies, this population-wide strategy would have the greatest impact of the three strategies considered in this analysis.”

[Important]

“Increasing omega-3 consumption would be less costly and more effective than an implanting Cardioverter Defibrillator strategy, it would reduce the risk of individuals who had not been identified as candidates for implanting Cardioverter Defibrillators, and it would not require the unique situation that is required for an Automated External Defibrillators to have an impact.”

KEY POINTS FROM DAN MURPHY

1) “Half a million people die suddenly each year, and, for half of these people, sudden death is the first indication that they have coronary heart disease.”

2) Raising median omega-3 fatty acid levels would lower total mortality by 6.4% (range 1.6% to 10.3%).

3) Implanting Cardioverter Defibrillators would be expected to lower total mortality by 3.3% (0.6% to 8.7%).

4) Distributing automated external defibrillators to all public places and all homes would lower total mortality by 0.8% (0.2% to 1.3%).

5) Supplementing with omega-3 fatty acid levels would have about eight times the impact of distributing automated external defibrillators to all public places and all homes and two times the impact of implanting Cardioverter Defibrillators for those with an appropriate indication.

6) “Consumption of omega-3s, fish, and fish oil reduces all-cause mortality and various cardiovascular disease outcomes such as sudden death, death from cardiac disease, and nonfatal myocardial infarction.”

7) “The predominant effect of high omega-3 consumption is a reduction in risk of sudden death.”

8) “The omega-3 effect would be eight times as large as one produced by implementing an Automated External Defibrillators strategy that placed devices in all public areas and all homes and would be twice as large as implementing a strategy that implanted Cardioverter Defibrillators in all individuals” with appropriate indications. [Key Point]
9) About 75% of the “reduction in deaths from the omega-3 strategy would accrue from increasing omega-3 levels in apparently healthy individuals, a group not normally the target of interventions to reduce the burden of sudden death.” [Very Important; this means that asymptomatic healthy individuals should be taking their omega-3s.]

10) “The American Heart Association and the American College of Cardiology have endorsed increased omega-3 intake by individuals who are apparently healthy, and recent quantitative analysis has concluded that increasing fish consumption would have a large net positive impact on public health.”

11) Automated External Defibrillators and implanting Cardioverter Defibrillators are both very expensive and are plagued by numerous technical and logistical obstacles. Omega-3 supplementation have none of the technical and logistical problems, are significantly more cost effective, and confer to the patient numerous other health benefits. Omega-3 supplementation actually prevents the event that leads to sudden death, while Automated External Defibrillators and implanting Cardioverter Defibrillators attempt to regulate the heart after the event has occurred.