保險醫學會誌 第2卷 第1號
J. of KLIMA, Vol. 2, No. 1, 1985

冠狀動脈心疾患의 變遷*

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死亡類型의 變化 : 過去, 現在, 未來

周知하시다시피 早期死亡을 惹起시켰던 疾病을 除去 또는 統制함으로써 今世紀初부터 平均壽命이 크게 向上되었읍니다.

1950年 이후에도 先進國에서는 早期死亡率을 若干 더 減少시킬 수 있었기는 하지만 平均壽命은 20世紀 初半과 같은 速度로 계속 增加시킬 수는 사실상 없었읍니다. 그러나 歷史的인 經驗과는 反對되는 現象이 발생했읍니다. 즉 40 세 以後의 死亡率이 크게 減少했다는 것입니다.

이 印象的인 變化는 各國마다 어느 정도 差異가 있으므로 本 講議에서 仔細히 설명드리기는 時間이 너무 걸릴것 같읍니다. 그러므로 중요한 傾向만 말씀드리겠읍니다.

1) 主要 Cardiovascular Disease로 因한 死亡 減少
2) Hypertensive Heart Disease로 因한 死亡 減少
3) Cerebrovascular Disease로 因한 死亡減少
4) Arteriosclerosis로 因한 死亡 減少
5) Active Rheumatic Fever와 Chronic Rheumatie Heart Disease로 因한 死亡 減少 몇몇 나라에서 보이는 中年期의 死亡減少로 因한 死亡類型 變化는 그 社會의 未來에 社會的 經濟的 關聯性을 지닐 것입니다. 하지만 이러한 肯定的인 傾向이 그 정도까지는 確認되지 않는 英國이나 獨逸같은 나라도 있읍니다.

Coronary Heart Disease로 인한 死亡率 減少에 관한 文獻들이 提示하듯이, 이러한 減少의 大多數 理由는 아직 明確하지 않읍니다.

어떤 科學者들은 心臟에 관련된 死亡率 減少가 Influenza와 pneumonia로 인한 死亡率 減少에 起因한다고 합니다. 왜냐하면 이 두 疾病은 Coronary Death에 影響을 미치는 것으로 알려져 있기 때문입니다. 死亡率 減少는 주로 겨울철 즉 呼吸器疾患으로 因한 死亡率이 絕頂에 달하는 期間에 이루어진 것이라는 證據도 있읍니다. 그러므로 心疾患으로 인한 死亡率 減少는 抗生濟療法의 발달과 연관지을 수도 있읍니다. 더우기 健康管理意識, Diet에 대한 注意運動 등도 一翼을 담당하고 있읍니다.

적어도 美國에서는 Cardiovascular Disease로 인한 死亡率이 더욱 減少될 것이라고 期待하는 데는 理由가 있읍니다.

Cardiopulmonary Resuscitation과 기타 應急處置 節次에 대한 知識 普及, Echocardiography, non-invasive radioactive test 등과 같은 診斷技術 發達, 마지막으로 그러나 중요한 意味를 갖는 行動上 危險要素에 대한 豫防姿勢들로 미루어 보아서 心疾患으로 因한 死亡率은 좀 더 減少될 것으로 기대됩니다.

오늘날 美國에 있어서 生命에 관한 見解와 長壽理由에 대한 一般人의 태도를 살펴볼 수 있는

* 本 論文은 1984. 9. 29. 韓國生命保險醫學會 學術大會에서 發表하였음.

美國版 test "How long will you－or do you want to－live？"의 改正版을 가지고 왔읍니다. 願하시면 一部씩 나누어 드리겠읍니다.

豫想하지 못했던 外部的 要因에 의하여 生命이 短縮되지 않는다면 個人이 살 수 있는 年數라고 "壽命"을 定義한다면 이 壽命에 앞으로 어떤 일이 發生하겠읍니까？

우선 人間의 壽命은 110年 정도이며, 壽命을 延長하거나 老化過程을 변경시키는 技術은 아직도 遼遠한 것 같읍니다. 따라서 老化過程에 대한 근본적이고 철저한 理解가 未來에 先行되어야 할 것입니다.

理論的인 모델을 들자면, 熱量이 낮은 飮食을 사용하여 쥐의 壽命을 두배로 늘어나게 한 Mc Cay Study나, 쥐에서 Tryptophan을 除去하는데 관한 Segal and Timiras Study나, 體溫을 낮춤으로 물고기의 壽命을 증가시킨 UCLA Study 등을 예로 들 수 있읍니다.

반면 個個人의 주어진 壽命까지 살 수 있다는 可能性만 하더라도 벌써 死亡類型에 중요한 영향을 미칩니다. 美國에서 이 現象은 "Curve－Squaring"이라고 일컬어 집니다.

실제 生存曲線은 年齡增加에 따라 下降하고 약 110세 즉 壽命에 達하여는 零에 到達합니다. 現代醫學의 導入－물론 Cardiovascular Disease 分野만 말하는 것은 아닙니다－은 일찍 死亡할 사람들의 餘命을 延長시킴으로 해서 이 曲線을 四角形에 더 가깝도록 만듭니다. 美國에서 이 Curve－Squaring은 向後 50年間 65세까지 生存하는 사람을 現在의 65％에서 약90％까지 增加시킬 것으로 보입니다.

이 假定에 따르면 65세 以上의 美國 人口는 오늘날 全體人口의 14％에 불과하지만 2025 年에는 약 1/4에 到達할 것으로 보입니다.

이 모든 豫想을 綜合해 보면 今世紀末에 이르러 早期死亡과 60代 혹은 70代 死亡이 減少하고 이에 相應하여 壽命의 限界點 근처에서 死亡者 數가 增加할 것입니다.

어쨌든 生活水準이 比較的 安定되고 醫學技術의 應用이 이루어진 우리 世代의 未來에는 生存曲線이 現在보다 더 四角形에 가까와 질 것이고 80세 근처에서 下降할 것입니다. 아마도 下降點의 기울기를 결정하는 것은 遺傳일 것입니다. 그러나 注意 깊은 科學者들은 生存曲線의 安定度가 다음 數10年 間의 技術的 社會的 事件들－ 예를 들면 死亡類型 變化에 따른, 經濟 成長의 長期化 傾向, 失業率, 高度成長 期間 등과 관련된 經濟變化－에 따라 심한 타격을 받을 수도 있을 것이라는 사실을 想起시킵니다.

生存曲線을 變化시키는 全體人口 死亡類型에 일어나고 있는 變化에도 불구하고 生命保險 Underwriting에는 Prognosis라는 거대한 分野가 남아 있으며 急變하는 診斷 및 治療 技術때문에 過去 어느 때 보다, 이를 위해서 새로운 醫學知識 習得을 계속하는 것이 요청됩니다.

Coronary Heart Disease(CHD) 의 Prognosis 傾向

약 10年前 다음과 같은 問題에 대한 解答을 얻기 위해 大規模 Coronary Heart Disease 豫防實驗을 試圖했읍니다.

1) 보통 사람들에게 食生活 및 習慣을 바꾸도록 說得하는 것이 可能한가？

2) 可能하다면 그들은 Heart Attack에 걸릴 可能性이 낮은가？

3) 그들은 더 오래 살 것인가？

여러 實驗 中에서 서로 다른 結果를 나타 낸 다섯 가지 實驗만 말씀 드리겠읍니다.

Oslo Study에 의하면 Cholesterol을 낮추며 禁煙을 하도록 적극 勸奬한 결과 40～49 세 사이의 危險이 높은 사람 中에서도 Coronary Heart Disease는 상당히 減少되었읍니다.

美國 Multiple Risk Factor Intervention Trial (MRFIT)은 10年間 막대한 努力과 費用을 投資하고도 별다른 중요한 結果를 얻어 내지 못했

으며 CHD 豫防에 대한 科學的인 成果도 없었읍니다.

또다른 중요한 實驗인 WHO European Collaborative Trial에 따르면 社會全體의 危險要素를 成功的으로 바꾸는 데는 나라 마다 상당한 差異가 있다는 中間結論을 얻었읍니다. 그러나 CHD에 대한 結論은 대체로 危險要素 變更에서 觀察된 것과 비슷했읍니다.

昨年에 出版된 有名한 "Coronary Artery Surgery Study (CASS)" 에 따르더라도 手術로 回復 可能性이 높은 Left Main Disease의 경우를 제외하면, 外科的 治療를 받은 患者와 內科的 治療를 받은 患者 사이에 平均死亡率의 統計的 差異는 별로 없었읍니다.

최근 발표된 無作爲統制二重盲檢法 實驗인 "The Lipid Research Clinics Coronary Primary Prevention Trial (LRC-CPPT)"의 重要 結果에 따르면 Blood Cholesterol의 減少가 Heart Attack이나 Heart Attack으로 인한 死亡을 減少시킨다는 사실을 結論的으로 밝혀 냈읍니다.

이러한 硏究들로부터 우리가 알 수 있는 것은;

1) 食生活習慣과 吸煙은 갑자기 變化되지 않으며,

2) 危險要素의 減少는 相應되는 危險의 減少로 連結되며,

3) 中年期의 內在的인 疾病은 危險을 逆轉시킬 수 있는 方向으로 影響을 받을 수도 있다는 것입니다.

伸士 淑女 여러분, Stable Angina Pectoris 의 死亡率에 대한 문제 및 外科的 治療와 內科的 治療의 문제를 바른 角度에서 살펴보기 위해 Coronary Surgery가 導入된지 14年 후인 1980 年의 Coronary Surgery 全體를 살펴보고자 합니다.

美國에서 120,000件의 Bypass Graft 手術이 약 US$ 13億의 費用을 들여서 이루어 졌으며 年間 약 3,000~9,000名이 死亡했읍니다. 國際圖表에 의하면 Bypass Surgery 件數는 대략 다음과 같았읍니다.

1) 샌프란시스코 灣 地域: 人口 100 萬當 5,550

2) 美國 (平均) : 人口 100萬當 350

3) 오스트레일리아 : 人口 100萬當 150

4) 英國 및 獨逸 : 人口 100萬當 80

美國의 1983年 統計値에 의하면 160,000件의 Bypass Surgery가 件當 US$ 26,000의 費用을 들여서 遂行되었읍니다.

이러한 狀況에서 우리는 外科的 治療를 위한 患者選擇이라는 문제에 도달하게 됩니다.

이 分野의 有名한 硏究家인 Palo Alto의 Stanford 醫科大學 Hultgren 教授는 다음과 같은 選擇基準을 말하고 있읍니다.

引用 :

"우리는 보통 50세 내지 54세 된 美國男子를 擇합니다. 이 사람들은 다음과 같은 原因—Coronary Disease, Cancer, Hypertension, Renal Infection, Cirrhosis, Metabolic Disease, Pulmonary Disease, Cerebral Vascular Disease, Violence Heart Disease 및 Valvular Disease를 위시한 기타 Heart Disease—으로 死亡한다.

Coronary Surgery를 위하여 患者를 選擇할 때 우리는, Chronic Pulmonary Disease of Cirrhosis나 Carcinoma 혹은 Systemic 系統의 深刻한 疾病이 있는 사람이나, Stroke를 經驗한 사람, 혹은 Valvular Heart Disease가 있는 患者들은 選擇하지 않읍니다.

앞에서 열거한 疾病이 없는 Coronary Disease 患者를 選擇하되 外來患者도 選擇합니다.

Infarction이 아무런 Symptom 없이 治療되었다 하더라도 Left Ventricular function이 나쁜 患者는 選擇하지 않읍니다. Inoperable Vessel, Congestive Failure, Aneurysm 혹은 Mitral Regurgitation이 있는 Coronary Disease 患者는 選擇하지 않읍니다"

本人 생각으로서는, 이 規則—비록 이 規則이

아무데서나 다 지켜지는 것은 아니지만—을 따라서 手術이 이루어지기만 한다면, Bypass 手術의 좋은 結果를 理解할 수 있는 열쇠가 이속에 포함되어 있읍니다. 따라서 引用이 좀 길었다 하더라도 그 만한 價値가 있는 것 같읍니다.

Coronary 手術 對象患者를 選別하기 때문에, 어떤 곳에서는 Coronary Artery를 除外하고는 健康狀態가 좋아서 결과적으로 Prognosis가 비교적 좋은 集團을 選擇하게 된다는 사실을 强調하고 싶읍니다.

CHD 의 外科的 治療와 內科的 治療

Stable Angina의 外科的 治療와 內科的 治療의 Prognosis에 關聯하여 몇몇 중요한 事項을 살펴 보겠읍니다.

1) 대체로 Left Anterior Descending Coronary Artery에 局限된 Single Vessel Disease 集團은 內科的 治療를 받으면 1年에 약 1% 정도 死亡하는 높은 生存率을 보입니다만 外科的 治療로는 별 改善이 없었읍니다.

2) Left Ventricle의 Anterior Surface循環을 沮害하는, 50% 以上의 Stenosis가 同伴된 Left Main Disease 集團의 內科的 治療후 低調한 生存率을 보이지만 外科的 治療 후 生存率은 양호합니다.

3) Three-Vessel Disease의 경우, 手術 후 生存率이 더 良好한 것 같으나 長期的 Prognostic View에 대한 結論을 내리기 위해서는 觀察期間이 더 필요한 것 같읍니다.

4) 手術로 生存率이 改善될 수 있는 또 하나의 集團은 生存率이 低調한 다음 4가지 重要 Non-invasive 要素—Resting EKG에서 S—T Depression, 過去 Infarction, 過去 高血壓, 過去 心機能異狀—들의 混合 集團입니다.

어떤 結論을 내려야 하겠읍니까?

우선 手術로 Symptom을 除去한다는 데는 疑問의 餘地가 없읍니다. Infarction에 대해서는 豫防도 어느 정도 希望이 있읍니다. 選擇된, 危險이 높은 集團에 대해서는 手術로 生命을 延長할 수 있다는 데도 疑問의 여지가 없읍니다.

달리 말씀드리면 두 가지 治療方法이 모두 매우 重要하며 效果도 있읍니다.

診斷方法의 發達과 더불어 各各의 境遇를 더욱 더 細分化시켜, Prognosis 豫測可能性을 增加시킬 수 있으며, Cardiologist 들은 保險加入 適格性을 決定하는 데 도움을 줄 수 있다는 確實한 證據가 있읍니다.

많은 Coronary Bypass Surgery 後續硏究에 따르면 選別된 集團의 手術 後 死亡率은 2.4 %이며 이는 正常數値에 接近하고 있는 것이라고 합니다.

生存率은 Coronary Morphology Score나 Left Ventricular Score 같은 Invasive Parameter 뿐만 아니라 Ischemic Score나 Heart Volume Score 같은 Non-invasive Parameter에도 밀접하게 관련지어 질 수 있읍니다.

그런데 너무나도 많은 略語들이 사용되기 때문에 本人은 Coronary Heart Disease 用語辭典을 편집하였읍니다. 願하시면 드리겠읍니다.

CHD에 대한 臨床的 見解를 마무리 짓기 前에, 1977年 Gruntzig가 유럽에서 처음 사용한 Transluminary Coronary Angioplasty (TCA) 혹은 "Balloon Dilatation"이라고 불리는 比較的 새로운 Invasive이면서 Non-Surgery Method 에 관해서 간단히 말씀드리겠읍니다.

그의 Method는 특히 Single-Vessel Disease가 있는 患者의 Myocardial Blood Flow를 改善하거나 正常化시킬 수 있으며, 점차적으로 全世界에서 認定하는 技術이 되어가고 있읍니다.

TCA는 現在 美國에서 多數가 이루어지고 있으며 1983年에 10,000件의 TCA가 이루어 졌읍니다.

TCA後 死亡率에 대해서, Bypass Graft Operation以後 死亡率 같이 믿을만한 結論을 내리기는 時期尙早입니다. 그러나 Single-Vessel Disease 중 앞에서 말씀드린 類型에 限해서는 Left

Anterior Descending Stenosis에 TCA를 行할 때 成功率은 現在 70～80%입니다. 따라서 머지 않은 장래에 生命保險을 請約하는 件數도 증가하리라 豫想됩니다.

Coronary 專門家들은 1984年 7月 American Council of Life Insurance Medical Meeting에서 다음과 같은 대략적인 規則을 提示했읍니다. 즉 가벼운 病은 內科的 治療 혹은 TCA를 받고 甚한 狀態는 CABG를 받읍니다. CABG後 3～5%는 10年 以內 再手術을 받읍니다. 좋은 結果를 豫測할 수 있는 變數들은 Graft의 Patency Left Ventricular Function 및 危險要素들입니다.

Underwriting에 대한 考慮

Angina Pectoris 이든 Myocardial Infarction 이든 診斷에 상관없이, 또 傳統的인 內科的 방법이든, Bypass Graft 手術이든 혹은 非外科的 TCA이든, 治療方法에 상관없이 우리는 항상 Coronary Heart Disease 라고 불리는 Chronic Disease를 다룬다는 사실을 念頭에 두어야 합니다.

臨床家들이 옳든 그르든 標準體死亡率에 아주 가깝다고 認定한 死亡率이 낮은 少數의 極히 良好한 Case와 謝絕體 範疇에 속하는 제삼의 集團을 除外하면 대부분 CHD는 中下부터 高度의 標準下體에 포함됩니다.

Best Review紙 1982年 9月號에 注目할만한, 美國人에 의한 寄橋가 "Young at Heart, or Fairy Tales May Come True"라는 題目으로 실려 있었읍니다. 그는 "Cardiovascular 分野의 死亡率 減少로 因해서 全體死亡率이 해마다 2%씩 減少되는 過去의 傾向이 未來에도 繼續된다고 보기위해서는 Cardiovascular Disease에 의한 死亡率이 未來에 陰數가 되어야 한다" 라고 했으며, 結論的으로 "사람들이 그것 (記事에 引用되었던 格言) 을 아는 지는 모르겠으나, 많은 사람들이 오늘날 生命保險을 販賣함으로써 損失을 보고 있다"라고 합니다.

伸士 淑女 여러분, 마지막으로 상당히 名聲있는 病院의 心臟科 患者에 대해서 직접들은 이야기로부터 Prognosis 問題의 複雜性을 말씀드리겠읍니다.

다음은 引用입니다.

"이 36세된 患者는 Coronary Heart Disease가 있으며 이 病 때문에 1981年 10月에 Coronary Artery Bypass Grafting을 받았읍니다. 그는 手術前에 심한 Angina때문에 活動이 制限되었으나, 적어도 1984年 4月 最近 檢査를 할 때까지는 더 이상 그러한 Symtom은 없었읍니다.

手術時에 가장 심하게 損傷된 Coronary Artery (Left Anterior Descending) 와 주요 Branch 중 하나를 Graft했읍니다. Graft되지 않은 다른 Coronary Artery에도 Atheroma가 있었읍니다. 그의 Prognosis는 Coronary Tree의 Coronary Atheroma 進展率 및 手術時에 이루어진 Graft의 Patency에 따라 다를 것입니다.

1984年 여기에서 檢査를 했을 때 Symptom은 전혀 없었으며 또한 아무런 Symptom없이 조깅과 농구를 하고 있었읍니다. 그는 또한 Normotensive였읍니다 (血壓 120/80). 그의 EKG는 正常値였으며 Chest X-ray에 의하면 心臟크기도 正常이었읍니다. 그는 手術 直後부터 Beta Blocking Drug을 規則的으로 服用하고 있읍니다. 그러나 그의 Prognosis를 斷定하기는 어렵습니다.

간단히 말씀드려, 별다른 Symptom없이 活動할 수 있는 可能性을 고려해 볼 때, 또한, 가장 深刻하게 영향을 받은 Coronary Artery가 Graft되었고 그의 Left Ventricular Muscle에는 Myocardial Infarctive Damage가 거의 없거나 전혀 없었다는 事實을 考慮해 볼 때 그의 Prognosis는 만족스러울 것이라고 생각됩니다. 그러나 Atheroma進展速度가 加速되고 있었던 젊은 사람이라는 점을 생각해 볼 때 5～6年 후의 Prognosis는 상당한 注意를 요합니다.

Angina가 再發한다면 Coronary Grafting 이

더 필요할 수도 있읍니다. 이를 별개로 하더라도 Coronary Heart Disease의 豫測不可能性을 고려해 볼때 그의 未來는 不透明합니다.

伸士 淑女 여러분,

우리가 직면한 Coronary Heart Disease의 變遷을 설명하기에 적합한 히포크라테스의 格言을 인용하므로써 本講議를 마치고자 합니다.

요술구술—貴下의 壽命

基本點數 ……	72

加/ 減點數

1. 家族經歷

① 祖父母 中 1人이 85세까지 生存하였을 境遇 ……	+2
② 祖父母 4人 모두가 80세까지 生存하였을 境遇 ……	+6
③ 祖父母 中 1人이 50세 未滿에 Heart Attack으로 死亡했을 境遇 ……	−4
④ 父母 中 1人 이나 兄弟 혹은 姉妹가 50세 未滿에 癌, Heart Condition, 糖尿病이 있었던 境遇 ……	−3

2. 個人經歷 및 現狀態

① 貴下가 男子일 境遇 ……	−3
② 貴下가 女子일 境遇 ……	+4
③ 人口 100萬以上의 都市에 居住하는 境遇 ……	−2
④ 人口 萬名 未滿의 地域에 居住하는 境遇 ……	+2
⑤ 年間收入이 US$ 50,000 以上일 境遇 ……	−2
⑥ 高等學校를 卒業했을 境遇 ……	+1
⑦ 學位나 資格證이 있는 境遇 ……	+2
⑧ 貴下가 65세 以上으로 아직도 일을 하고 있는 境遇 ……	+3
⑨ 配偶者 혹은 同居人과 같이 살고 있는 境遇 ……	+5
⑩ 獨身인 境遇 …… (25세 基準으로 10年마다 - 1)	−1
⑪ 事務職인 境遇 ……	−3
⑫ 激烈한 肉體的 運動을 規則的으로 하는 境遇 ……	+3
⑬ 적어도 30分이상 週5回 激烈한 肉體的 運動을 하는 境遇 ……	+4
⑭ 週 2～3回 스포츠를 즐기는 境遇 ……	+2
⑮ 每日 10時間以上 자는 境遇 ……	−4
⑯ 性格이 急하고 挑戰的인 境遇 ……	−3
⑰ 性格이 溫和하고 푸근한 境遇 ……	+3
⑱ 均衡이 잡힌 境遇 ……	+1
⑲ 憂鬱한 境遇 ……	−2
⑳ 每日 10～20개피의 담배를 피우는 境遇 ……	−3
㉑ 每日 20～40개피의 담배를 피우는 境遇 ……	−6
㉒ 每日 40개피 보다 많은 담배를 피우는 境遇 ……	−8
㉓ 每日 1ℓ의 葡萄酒나 그에 相應하는 알콜을 規則的으로 攝取하는 境遇 ……	−2
㉔ 더 많은 알콜을 攝取하는 境遇 ……	−4
㉕ 5～15 *kg* 重量超過인 境遇 ……	−2
㉖ 15～25 *kg* 重量超過인 境遇 ……	−4

㉗ 25 kg 超過 重量超過인 境遇 …… −8
㉘ 40세 이상으로 規則的인 健康診斷을 받는 境遇 …… +2

3. 年齡調節 戀數
① 貴下의 年齡이 30~40세인 境遇 …… +2
② 貴下의 年齡이 40~50세인 境遇 …… +3
③ 貴下의 年齡이 50~70세인 境遇 …… +5
④ 貴下의 年齡이 70세 超過인 境遇 …… +5

4. 點數를 計算하시오

總 點
最終點數
(加/ 減)

5. 基本點數에서 總點을 加減하시요.
(總點을 基本點數 72에 加減한 結果가 貴下의 豫想壽命입니다)
貴下의 豫想壽命 _____

Medica 4 : 302, 1982 및 美國版 Test " How long will you - or do you want to - live? " 의 變形입니다.
(Kraus, 1982. 7)

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保險醫學會誌 第2卷 第1號
J. of KLIMA, Vol. 2, No. 1, 1985

The Changing Scene of Coronary Heart Disease

Munich Reinsurance Compancy Co., Ltd.

Medical Director : Herbert K. Kraus, M.D.

Changing Mortality Patterns : Past, Present and Future

It is known, that there is great progress in life expectancy at birth, which has occurred since the beginning of this century through the control and elimination of diseases which caused early childhood death. Except for the possibility of some slight further reduction in mortality immediately after birth in developed countries since the 1950's there was virtually no was that life expectancy at birth could continue to increase at the rate it had been increasing in the first half of the 20th century.

However something contrary to historical experience happened : death rates past age 40 began to decline appreciably. There are changes also in the causes of deaths. Any figures on these impressive changes which differ to an extent from country to country would take to much time in the frame of this paper.
Let me therefore give you just the major trends :

1. Deaths from major cardiovascular diseases dropped
2. Hypertensive heart disease deaths dropped
3. Cerebrovascular disease deaths dropped
4. Arteriosclerosis deaths dropped
5. And even deaths from active rheumatic fever and chronic rheumatic heart disease dropped.

Changes in the mortality patterns for middle aged people in a number of countries are of such dimensions that they have social and economic implications for the community in the immediate future. There are however other countries, for example the UK and the Federal Republic of Germany, where this positive trend could not be confirmed to such an extent.

As the publications on the decline in coronary heart disease mortality reveal, the causes of the greater part of these declines are not clear. Some scientists attribute the decline in heart-related deaths to the decrease in mortality from

influenza and pneumonia, since these two disease are known to influence the coronary death rate. There is evidence that the decrease in the death rate has occurred primarily in the winter months, also the peak months for respiratory disease mortality. Therefore the reduction in heart deaths may be related to an advance in antibiotic therapy. Furthermore, consciousness about health care, attention to diet, and exerciese have also played a part.

There are reasons to expect further declines in mortality due to cardiovascular disease at least in the USA. The spreading knowledge about cardiopulmonary resuscitation and other emergency procedures, improved diagnostic technoligies like echocardiography, noninvasive radioactive tests etc. and, last but not least, preventive attitudes towards fighting behavioural risk factors hold promise for the further reduction of the death rate due to heart disease.

As an example of the present philosophy of life in the USA with an attitude of the general population towards analysis of reasons for longevity, I have taken with me a modified version of the American test "How long will you – or do you want to – live?" Copies are available to you on request.

What is therefore going to happen with our "life span", which is defined as the number of years an individual may be expected to live, provided there is no unexpected undue intervention to cut his or her life short? First of all, the human life span is approximatery 110 years and technologies which extend the span, and modify the aging process itself seem somewhat distant and require future fundamental breakthroughs in understanding the mechanics of aging. Theoretical models, for example, are the Mc Cay Study in doubling the life span of rats by using a low – calorie diet, or the segal and Timiras study on depriving rats of tryptophan or the UCLA – Study in increasing the life span of fish by lowering the body temperature.

On the other hand, the likelihood that the individual will survive to complete his span is already an important effect on patterns of mortality. In the USA this phenomenon is called "curve – squaring", The actual survival curve rounds off with increasing age and reaches zero at a life span of about 110 years. The thrust of modern medicien – of course not only in the area of cardiovascular disease – is to make this curve more rectangular, extending the life expectancy of people who would have died earlier than their life span. In the USA it is assumed that curve – squaring would be successful to the extent of increasing over the next 50 years the percentage of survival to age 65 from about 65% now to about 90%. Based on this assumption, the number of people in the United States over age 65 by the year 2025 will reach almost one quarter of the population as compared to about 14% today.

A summary of all those predictive considerations leads to the expectation by the end of the present century, that there will be a great drop in the incidence of "early" death and death in the sixth or even seventh decade with a compensating increase in the number of deaths near the end of the life – span.

Anyway, for our generation in comparable frames of living standard and applied medical technologies the future holds a survival curve even more squared than the present curve, with a steep cliff at about ago 80. Probably the major factors determining the slope of that cliff will be genetic. Cautious scientists remind us however, that the stability of the survival tables may be greatly undermined not only by technological but also by social events during the next decades, for example implications of national economic changes for mortality rates incorporating the long-term trend in economic growth, the unemployment rate, and periods of rapid economic growth.

Notwithstanding what is going on with regard to mortality in whole populations which effects the survival tables there remains a large prognostic area for life insurance medical underwriting, which due to the quickly changing diagnostic and therapeutical techniques is much more of a challenge than for the previous generation to continually update our medical knowledge.

Prognostic Trends of Coronary Heart Disease (CHD)

About a decade ago some very large trials of coronary heart disease prevention were set up to answer such questions as :

1. Can ordinary people be persuaded to change their eating and living habits?
2. If so, will they be less susceptible to heart attacks?
3. Will they live longer?

From a number of such trials let me mention just five with different results.

The oslo study showed that energetic advice to follow a cholesterol – lowering diet and to stop smoking could produce a significant fall in coronary heart disease among high-risk men aged 40-49.

The results of the U.S. Multiple Risk Factor Intervention Trial (MRFIT) after 10 years of enormous labor and expense prove nothing significant and are without scientific profit regarding the questions of CHD-Prevention. From another major study, the W.H.O. European Collaborative Trial, the preliminary results indicate that success in changing risk factors in whole communities varied widely between countries. However, the outcome with ragard to CHD broadly corresponded to the observed changes in risk factors.

The well-known "Coronary Artery Surgery Study"(CASS) published last year did not result in a statistically significant difference between the average mortality in patients assigned to surgical treatment and those receiving medical therapy with the exclusion of patients with left main disease which have an improved survival with surgery.

The major findings of the recently published randomized controlled double blind trial, "The Lipid Research Clinics Coronary Primary Prevention Trial" (LRC-CPPT) established conclusively that lowering blood cholesterol reduces heart attacks and heart attack deaths.

What we have learned from these studies is :

1. that eating and smoking habits are not suddenly transformed,
2. that reducing risk factors leads to a corresponding fall in risk,
3. that the underlying disease in middle-aged men can be influenced thus resulting in the reversibility of risk.

Ladies and Gentlemen, in order to put the question of mortality in stable angina pectoris, medical versus surgical treatment into the right perspective I should first look at the global picture of coronary surgery which we arrived at in 1980, 14 years after its introduction.

120,000 bypass graft operation were performed in the USA at the cost of approximatery 1.3 billion dollars with an operative mortality of about 3,000 to 6,000 deaths per annum. The international charts show the following appro-ximate incidence of bypass surgery:

1. San Francisco Bay area 5,550 per million population.
2. USA (average) 350 per million population
3. Australia 150 per million population
4. UK and Federal Republic of Germany 80 per million population

The 1983 numbers from USA are :just under 160,000 bypass operations at the cost of US$ 26.000 each.

This situation leads us to the next question about the selection of patients for surgical treatment.

According to the famous researcher in this area, Professor Hultgren of Stanford University Medical School, Palo Alto, USA, the following selection criteria have been mentioned :

Quote :

"We select them from the the U.S. male population, usual age 50 te 54 This population group dies from the following causes: Coronary disease, cancer, hypertension, renal infection, cirrhosis, metabolic and pulmonary diseases, cerebral vascular disease, violence, and other heart disease including valvular disease. When we select patients for coronary surgery, we do not select patients who have chronic pulmonary disease of cirrhosis, who have carcinoma or a severe disease of a systemic nature, who had strokes, or who have valvular heart disease. We select patients with coronary disease. Who are free these above diseases but we also select out-patients with coronary disease. We do not select patients who have he- not select patients who have severe coronary disease with inoperable vessels, congestive failure, aneurysm, or mitral regrgitation".

My lengthy quotation seems appropriate, because in my opinion it contains the key to understanding the good results of bypass operations, as long as they were performed along these rules of selection-which, by the way, are not followed everywhere. May I underline, that as a result of the process of selecting

patients for coronary surgery, one selects in some centers a group with an excellent degree of health except for their coronary artery findings which therefore has a relatively good prognosis.

Medical versus Surgical Treatment in CHD

Now let us look at the important aspect of the prognosis of medical versus surgical treat ment in stable angina:

1. The subgroup single-vessel disease which is conformed in most cases to the left anterior descending coronary artery has an excellent survival record with a mortality of about 1% per year on medical treatment: surgical treatment has shown no improvement.
2. The subgroup left main disease with 50% or more stenosis imparing circulation to the anterior surface of the left ventricle has a very poor medical survival rate; with surgical treatment the survival rate is good.
3. In three-vessel disease there seems to be a better survival rate with surgery, a longer observation period however would be necessary in order to draw conclusions for our long-term prognostic views.
4. Another subgroup in which the survival rate may be improved by surgery is the mixed group with the four most important non-invasive predictors of poor survival: S-T depression in a resting electrocardiogram, a history of prior infarction, a history of nypertension and functional heart disorders.

What are the conclusions to be drawn?

First of all there is no doubt about the relief of symptoms by surgery-- there is some hope about the prevention of infarction-no doubt anymore abouth the prolongation of life by surgery in selected high-risk subgroups.

In order words, both methods of treatment are very important and they are effective.

There is clear evidence that the increasing individualisation of cases together with the progress of diagnostic methods will improve the predictability of prognosis and cardiologists will help decide about the appropriateness of insurability.

Numerous follow-up studies after coronary bypass operation demonstrate a yearly mortality of 2-4%, for selected groups survival rates approach normal values. Survival rates can now be closely related to both invasive parameters such as the "Coronary Morphology Score" and the "Left Ventricular Score" as well as to non-invasive parameters such as the "Ischemic Score" and the "Heart Volume Score".

By the way there are so many abbreviations in use that I have compiled a"Glossary of Coronary Heart Disease", which is available to you on request.

Before I close this clinical overview on CHD let me touch shortly on the rela-

tively new invasive, non-surgical method called Transluminal Coronary Angioplasty (TCA) also termed "Balloon Dilatation" which was first used 1977 in Europe by Gruntzig. His method is capable of improving or normalizing myocardial blood flow particularly in patients with single-vessel disease and has subsequently become an internationally accepted technique. TCA is performed at present in large numbers especially in the USA, where 10,000 TCA's were done in 1983.

It is still some what premature for mortality conclusions as reliable as after coronary bypass graft operations. However within the framework of the above outlined risk pattern for single vessel disease, taking into account a present success rate between 70 and 80% after TCA in left anterior descending stenoses, one can expect an increasing number of applications for life insurance in the not too distant future.

Coronary disease experts gave at the July 1984 meeting of the American Council of Life Insurance Medical Meeting the following rule of thumb : mild disease undergoes medical treatment or TCA-severe disease will have CABG. 3-5% of patients after CABG have to be reoperated within a 10 years period and the prognostic parameters for good results are patency of the graft, left ventricular function and the risk factor profile.

Underwriting Considerations

We should always keep in mind that independent of the diagnosis, whether it is angina pectoris or my cardial infarction, and the method of therapy, whether conventional-medical or operatively with bypass graft or non-surgical with TCA, we always deal with a chronic disease which is called coronary heart disease.

If one discards the relatively small number of best selected cases with a rather low mortality rate, which some clinicians rightly or wrongly bring into close vicinity of standard mortality, there remains the majority of CHD-risks which falls in the range between low/middle and high/very high substnadard categories not including the third group which lies in the decline area.

In "Best's review" of September 1982 there is a remarkable contribution from the USA entitld "Young at Heart, or Fairy Tales may come ture," I quote: "By continuing the overall downward trend in mortality rates at a rate of 2% per year and projecting reduced mortality rates in the cardiovascular area, we find that the death rate due to cardiovascular disease eventually becomes negative. The article closes, I quote :"Well, they may not know it yet, but there are many people losing money selling life in surance today".

Ladies and Gentlemen, let me give you at the end of my overview an example of the complexity of the problem of prognosis based on a personal communication about a patient from a highly reputed hospital cardiology unit.

I quote :

"This 36 years old patient has coronary heart disease for which he had coronary artery bypass grafting in October 1981. He had been restricted by severe angina before operation but has had no such symptoms since, at least until his most recent review in April 1984. At surgery the most severly affected coronary artery (the left anterior descending) and one of its major branches were grafted. There was atheroma in other coronary arteries which were not grafted. His prognosis will depend upon the rate of advance of coronary atheroma throughout his coronary tree and also upon the patency of the grafts which have been placed at surgery. When reviewed here in April 1984 he was quite free from symptoms and undertaking basketball and jogging without symptoms. He was normotensive (BP 120/80). His ECG was within normal limits and his chest x-ray showed a normal sized heart. He has been taking a beta blocking drug regularly since shortly after surgery.

It is difficult to determine his prognosis. In the short term, considering his good effort capacity without symptoms, the fact that the most seriously affected coronary arteries were grafted and also the fact he had little or no myocardial infarctive damage to his left ventricular muscle, makes the prognosis satisfactory.

However, considering that he is a young man who must be regarded as having accelerated development of atheroma his prognosis beyond five or six years should be guarded. There may be the capacity for further coronary grafting should angina return but this apart, considering the unpredictable nature of coronary heart disease and its symptomatic presentation, his future remains uncertain".

Ladies and gentlemen it seems appropriate to close with an aphorism by Hippocrates which illustrates the situation we face in a changing scene of coronary heart disease.

"The Crystal Ball" – Your life expectancy

Starting score		72
	Puls/minus	Points
I. Family case history		
— one grandparent reashed the age of 85	+2	
— All 4 grandparents reached the age of 80	+6	
— one parent died of a stroke or heart attack before reaching 50	−4	
— There has been a cancer, heart condition or case of diabetes mellitus in one parent, brother or sister under 50	−3	

Ⅱ. Personal case history and present status	
— You are male	−3
— You are female	+4
— Youlive in an urban area of 1 million or more inhabitants	−2
— You live in a community of fewer than 10,000 inhabitants	+2
— You annual income exceeds US$ 50,000	−2
— You have completed highschool	+1
— You are in possession of a degree or title	+2
— You are 65 years or older and are still working	+3
— You are living with a spouse or companion	+3
— You live alone	−1 (for each decade beginnring with age)
— You have a desk job	−3
— You do strenuous physical exercise regularly	+3
— You engage in at least 1/2 hour of strenuous physical exercise 5 times a week	+4
— You do sports 2 to 3 times per week	+2
— You sleep more than 10 hours a night	−4
— You are rash and aggressive	−3
— You are calm and relaxed	+3
— You are well−balanced	+1
— You are depressed	−2
— You smoke 10 to 20 cigarettes a day	−3
— You smoke 20 to 40 cigarettes a day	−6
— You smoke more than 50 cigarettes a day	−8
— You drink 1 liter of wine or comparable quantities of alcohol regularly	−2
— You drink more than the above quantity of alcohol regularly	−4
— You are 5 to 15 kilos everweight	−2
— You are 15 to 25 kilos overweight	−4
— You are more than 25 kilos overweight	−8
— You are over 40 years old and undergo annual physical check−ups	+2
Ⅲ. Age adjustment factor	
— You are between 30 and 40 years old	+2
— You are between 40 and 50 years old	+3
— You are between 50 and 70 years old	+4
— You are over 70 years old	+5

Ⅳ. Calculating your score

Total :
Final score
(Plus/minus) : .....

Ⅴ. Figuring your total score against starting score
(Your score is figured against the starting score of 72. The result is your predicted life expectancy)

Your life expectancy : .....

Modified version of MEDICA 4 : 302, 1982, as well as the American test " How long will you – or do you want to – live ?" (Kraus, July 1982)