Rise and fall in ischemic heart disease mortality - it may have happened before

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The rise in ischemic heart disease (IHD) mortality occurring mostly during the first half of the 20th century is usually associated with economic development and its consequences for people's lifestyles. On the basis of historical evidence, it is postulated that a previous IHD epidemic cycle may have occurred in England and Wales towards the turn of the nineteenth century. The implications of this on causal theories and current etiological research on atherosclerosis are discussed.

Myocardial ischemia, mortality

Introduction

A rise and fall in ischemic heart disease (IHD) mortality has occurred in the United States, as well as in several other countries, over the last 60 years. Three conferences2,3,5 were held between 1978 and 1988 to discuss the epidemic, without any significant progress being made towards the general understanding of its determinants.

The increasing impact of the IHD mortality upon the overall mortality rates was concomitant with the economic development of the industrialized countries, particularly following World War II. The rise in IHD mortality was naturally taken as a result of that development and of its consequences on people's lifestyles, associated with the demographic changes already in course since the turn of the century. The fact that researchers had all elected the descending limb of the cardiovascular mortality curve as the one which deserved to be explained is highly significant.

Etiological research on IHD followed in the wake of those conceptions, and of their associated paradigm: the lipid hypothesis1,4,6,10, one up-to-date version of it being that expressed by Ross8:

Diet-induced hypercholesterolemia leads to changes in endothelium and monocytes that result in increased monocyte adherence, subendothelial migration, accumulation of lipid to form foam cells and gradual accumulation of smooth muscle to form fatty streaks.

The lipid hypothesis as the dominant theory on atherogenesis and IHD causation, and changes in individual lifestyles as probable determinants of the observed secular changes in IHD mortality have logically oriented the choice of the main variables under study, either in individual-centered or in population-based research.

To demonstrate that all the research effort, time and money spent during the last 15-20 years did not bring the expected results, suffice it to say that the conclusions of the Decline Conference of 1978 remain valid to this date:

Although the decline in coronary heart disease (in the US) is real, the probable cause or causes could not be precisely identified... both primary prevention through changes in risk factors, and fundamental and clinical research leading to better medical care.
probably have contributed to but do not fully explain the decline”.

Such poor progress towards the understanding of disease causation seems a sure indication that, somewhere, someone took the wrong turning.

Reframing the Problem

Concomitance of economic development and rise in IHD mortality has been understood as causal association. Is it not possible that it might have been just a question of coincidence in time? If that was so, and if one regards the mortality trend as a true epidemic, it would be reasonable to ask if other epidemics might not have occurred in the past!

Methodology

A comprehensive review of the historical development of knowledge relating to coronary circulation and its diseases, written by Willius in 1945-46 was found to be a valuable source of information in the search for an answer to the above question. It gives an excellent account of the emergence of clinical descriptions of angina in the eighteenth century and of disputing views regarding its true nature during the nineteenth century, with physicians’ opinions varying from symptoms of purely nervous origin to symptoms of an ischemic nature based on impaired coronary arteries.

Going through Willius’s review with the hypothesis of an IHD epidemic in mind could lead to different interpretations of some of the original historical records quoted by him.

Results

During the early industrial revolution thousands of people moved from the land to crowded urban centers. Disease and misery increased and became more obvious. The growth of large towns made the development of very large hospitals possible. Around 1760, the majority of the large general hospitals in London had already been established. Rather than continuing the medieval practice of providing for the poor, hospitals began to limit themselves to the care of the sick. This exerted a peculiar influence on the medical sciences, as it ensured a supply of clinical material adequate for the needs of systematic research.

According to Willius, though earlier mention of the anginal syndrome had occurred, the most complete and classical description of it was that by Heberden (1710-1801) of London. Heberden apud Willius (p.331-3) was not aware of the fact that the syndrome he masterfully described was associated with disease of the heart when, in 1772, he named the disorder angina pectoris:

But there is a disorder of the breast marked with strong and peculiar symptoms, considerable for the kind of danger belonging to it, and not extremely rare, which deserves to be mentioned more at length. The seat of it and the sense of strangling and anxiety with which it is attended, may make it not improperly be called angina pectoris. Those who are afflicted with it, are seized while they are walking (more especially if it be uphill, and soon after eating) with a painful and most disagreeable sensation in the breast, which seems as if it would extinguish life if it were to increase or to continue; but the moment they stand still, all this uneasiness vanishes. In all other respects, the patients are, at the beginning of this disorder, perfectly well, and in particular have no shortness of breath, from which it is totally different. The pain is sometimes situated in the upper part, sometimes in the middle, sometimes in the bottom of the os sterni, and often more inclined to the left than to the right side. It likewise very frequently extends from the breast to the middle of the left arm.

The pulse is, at least sometimes, not disturbed by this pain, as I have had opportunities of observing by feeling the pulse during the paroxism. Males are more liable to this disorder, especially such as have past their fiftieth year. After it has continued a year or more, it will not cease so instantaneously upon standing still; and it will come on not only when the persons are walking, but when they are lying down, especially if they lie on the left side and oblige them to rise out of their beds. In some inveterated cases it has been brought on by the motion of a horse, or a carriage, and even by swallowing, coughing, going to stool or speaking, or any disturbance of mind.

Such is the most usual appearance of this disease; but some varieties may be met with. Some have been seized while they were
standing still, or sitting, also upon first wak-
ing out of sleep; and the pain sometimes
reaches to the right arm, as well as to the left
and even down to the hands, but this is
uncommon; in a very few instances the arm
has at the same time been numbed and
swelled. In one or two persons the pain has
lasted some hours or even days; but this
happened when the complaint has been of
long standing, and thoroughly rooted in the
constitution; once only the very first attack
continued the whole night.
I have seen nearly a hundred people under
this disorder, of which number there have
been three women and one boy twelve years
old. All the rest were men near or past the fifti-
eth year of their age...

...The termination of the angina pectoris is
remarkable. For if no accident interferes,
but the disease goes on to its height, the
patients all suddenly fall down, and perish
almost immediately. Of which indeed their
frequent faintness, and sensations as if all
the powers of life were failing, afford no
obscure intimation.

It is self-evident from Heberden’s description
that angina pectoris was by no means a rare con-
dition at that time in London. In accordance with
this is the fact that, before the end of the century,
John Hunter (1728-1792), Edward Jenner (1749-
1823) and Caleb Parry (1755-1822) had firmly
established the relationship of this clinical picture
with hardening and narrowing of the coronary
arteries, through postmortem examination in cases
in which the patients had had angina. By the end
of the eighteenth century, angina pectoris was a
well established clinical entity. As was stated by
Parry apud Willius (p. 334), in 1799:

Although there can be no reason to doubt
that mankind must have been subjected to
this disorder from the remotest antiquity, it
is somewhat extraordinary that so many
ages have elapsed without any notice of its
existence either as a distinct disease, or as
a variety of one commonly known.

His surprised reference to the novelty of the
emergency of angina is remarkable.

In 1909, Burns (1781-1813) apud Willius (p. 78)
accepted the coronary origin of the angina
as indicated by the following quotation:

To Drs. Heberden, Jenner and Parry we
owe the most of our information respecting
this most fatal complaint... (which the latter)
had incontrovertibly proved to origi-
nate from some organic lesion of the
nutrient vessels of the heart.

Burns was the pioneer sponsor of the ischemic
theory of angina pectoris (In Willius).

But how to explain, after the exceedingly
good characterization of the angina pectoris and
its incontrovertibly proved association with
obliterative disease of the coronary arteries
(which had taken place in the late 1800’s), the
prevailing confusion regarding its true nature
towards the second half of the nineteenth cen-
tury? Forbes, apud Willius (p. 81), in England,
claimed in 1845:

In about 50 per cent of cases of angina
there were no organic disease and in the
remaining cases, a great variety of cardiac
and especially aortic lesions occurred.

Gibson, apud Willius (p. 81), in Edinburgh,
stated in 1898:

The group of symptoms known from the date
of their earliest scientific analysis by the
term angina pectoris, forms a variable pic-
ture produced by morbid conditions scarce-
ly if at all less diverse in character than the
clinical appearances.

It was as if within a period of about 70 years
(1772-1845), the angina pectoris had lost its origi-
 nal strength as a distinctive clinical entity. Its his-
torically associated symptoms seemed to have
become more diverse in character and less specif-
ically related to disease of the coronary arteries
then they once had been.

Considering chest pain a diagnostic test for an
anatomo-pathological diagnosis of obliterator
disease of the coronary arteries, according to
modern epidemiological concepts, a temporal
reduction of the predictive value of chest pain
relating to disease of the coronary arteries could
be explained by a reduction of the prevalence of
this disease over time.

Based on such compelling historical and epi-
demiological evidences, one is obliged by reason
to recognize that a previous IHD epidemic may
have occurred towards the turn of the nineteenth
century, in England and Wales.
Discussion and Conclusions

The recognition of a previous epidemic cycle of IHD (particularly one occurring in possibly the most depressed years of that population) would immediately disqualify individual lifestyles as a possible determinant of temporal trends in IHD mortality. It would equally weaken the lipid hypothesis as the main explanatory theory for atherogenesis. Both hypotheses are inconsistent with a previous IHD epidemic assumption.

Diet-induced hypercholesterolemia (and possibly other "risk factors") would still retain a contributory role within the causal web leading to IHD mortality. But the time may have come when etiological research should put aside the continuing search for the causes of individual cases to search instead for the cause of the epidemic presentation of the disease.

References


Resumo

O aumento na mortalidade por cardiopatia isquêmica ocorrido neste século é usualmente associado ao desenvolvimento econômico e a suas consequências no estilo de vida das pessoas. Com base em evidências históricas, levanta-se a possibilidade de ter havido outro ciclo epidêmico de cardiopatia ao redor do mundo para o século 19, na Inglaterra, e discute-se as implicações decorrentes desta hipótese para a pesquisa em aterogênese. Isquemia miocárdica, mortalidade.