

The Balkan Stroke Epidemic

David Bresch, M.D.

Department of Psychiatry, Mount Sinai Hospital

Department of Preventive Medicine and Community Health

State University of New York Health Science Center at Brooklyn

This article was supported in part by a travel grant from the Alumni Foundation,
S.U.N.Y. Health Science Center at Brooklyn

Generous assistance was provided by Professor Pascal Imperato

Abstract

Eastern Europeans are suffering from high rates of stroke compared to Western Europeans. Their excess morbidity from cerebrovascular disease is the result of their health systems' inability to meet the challenges of modernization, including changes in lifestyle that predispose to that condition. The failure manifested itself in the nineteen-sixties and has continued to worsen until the present. This paper reviews available data to show the root causes of higher stroke morbidity. These causes may be amenable to a number of interventions. They include the appropriate therapeutic management of hypertension, as well as prevention.

INTRODUCTION

The Balkan countries consist of Albania, Bulgaria, Greece, Romania, Turkey, and Yugoslavia. Reports have surfaced that the former Communist countries among them have experienced a serious decline in health, both since the beginning of democratization in the last decade, and throughout the post-World War II era (1, 2, 3, 4, 5, 6). This health decline has resulted from many specific morbidities including cancer, heart disease, and stroke. Strokes have been disproportionately responsible (figure 1).

Until now, investigators have reported the separate health outcomes of east and west and attempted to come to some general conclusions about increasing mortality. No one has definitively identified the causes of the health split between east and west, and discussions that have focused on conventional risk factors in Eastern Europe are extremely few. What we

may call the Balkan Stroke Epidemic merits a reconsideration of the data. Since stroke rates are distinctively high in Bulgaria and Romania, this article focuses on those countries (figure 2). It consists of data related to conventional explanations for stroke, discussions of the region's history and health care system, and conclusions.

DATA

After World War II, eastern and western Europe seemed to enjoy similar health care. Until the 1960's, the centrally planned economies even narrowed gaps in life expectancy that existed before the war. However, between the middle-sixties and the present, male life expectancy fell and progress for females halted (2,3,6). A substantial part of this change was due to ischemic heart disease and stroke.

There are at least as many doctors per capita in the centrally planned economies as in the west, so a simple absence of health care cannot explain these trends. For example, there are thirty-four doctors per 10,000 people in Bulgaria; there are only twenty-seven doctors in the United States (7). The economic failure of Communism to keep pace with the west does not explain health difficulties, because adult male mortality in the newly democratic countries is greater than their wealth would predict, taking countries from other regions into account (3).

Call one explanation "psychological." The conventional approach to stroke morbidity emphasizes lifestyle choices like cigarettes or a diet high in saturated fat; the "psychological" view dismisses these and points to emotional stresses that promote early death. These postulated stresses would have resulted from state socialism's failure to satisfy aspirations to prosperity, and these frustrated aspirations caused "pathological" unhappiness (2).

Evidence cited in support of this view includes the individual case of Albania, one of the most isolated countries in the world under Communism. It is also a country with a low rate of premature adult death (though high infant mortality). During the Cold War, it was particularly isolated from the heightened expectations that may have made other Eastern Europeans so unhappy.

Furthermore, supporters of the "psychological" view point to the disproportionate share of premature death suffered by single and divorced men in Poland and Hungary compared with married men. They think marriage protective against the pathological stress that may have caused such high rates of adult mortality in Eastern Europe (2). Vitlianova (8) and Wnuk-Lipinski (6) both found that the most educated in Bulgaria experience health declines beyond that of their less-educated counter-parts. This might result from the most educated's being the most sensitive and the most frustrated by their constraints. Yet, a psychological cause for elevated

stroke does not explain how Balkan unhappiness would be different from unhappiness elsewhere in the world.

Many have argued that pollution also plays a role in the poor health of Eastern Europe. Nevertheless, nineteen ninety-two data show that countries in the west are more heavily damaged by pollution than those in the east (2). Men suffer higher mortality than women and rural individuals more than urban ones, two facts that further erode the idea of pollution as culprit. It should affect urban inhabitants worse than rural, and the sexes equally.

However, most authors agree that whatever stress led men to die sooner in Eastern Europe, it manifested itself in the sixties. Moreover, certain proximate causes of death have contributed more than others to the worsening situation. As described above, stroke is most responsible for the decline in health in Bulgaria and Romania.

Known risk factors for circulatory disease must be involved in the Stroke Epidemic, since all the countries involved in the Stroke Epidemic have also had the highest cardiovascular disease rates in Europe. In 1992, for example, Hungary, Bulgaria, and Romania were first, second, and third, respectively, in cardiovascular disease rates (9). Established modifiable risk factors for stroke include alcohol or salt excess, diabetes, folate deficiency, hypertension, hypercholesterolemia, hypercysteinemia, smoking, and obesity (10). Of all these risk factors, only alcoholic excess is not a contributor to cardiovascular disease. This would explain why stroke rates and heart attack rates rise in tandem. One might argue, in fact, that the Balkan stroke epidemic is really a Balkan circulatory disease epidemic (figure 3). We may study each of the risk factors in the Balkans in detail except for excess salt, folate deficiency, hypercysteinemia, and obesity.

Tobacco: we cannot directly evaluate tobacco consumption in Romania or Bulgaria with available data. Nevertheless, we can infer certain facts about smoking in the Balkans. In Bulgaria, we know state tobacco production: cigarette subsidization makes state production approximate domestic consumption, since the population has a powerful incentive to purchase domestic cigarettes. In Romania, actual cigarette sales are available, including all domestic or imported cigarettes (11). In both Bulgaria and Romania, detailed lung cancer statistics exist: lung cancer rates are directly proportionate to tobacco consumption (12).

Based on these indirect measures of Balkan tobacco consumption, we find that neither Bulgaria nor Romania owes their high stroke mortality rates to tobacco consumption. By one estimate for instance, the total deaths due to smoking in Bulgaria and Romania are proportionately less than in the United States. In 1995, cigarette smoking caused thirty percent of Bulgarian male deaths and thirty-two percent of Romanian, while it led to as much as thirty-eight percent of American ones, in the group between thirty-five and sixty-nine years old. The figures of the over-seventy group are more striking: smoking led to six percent of Bulgarian, six percent of Romanian,

but twenty-five percent of American death (12). Some investigators have pointed to rises in tobacco consumption in the nineties (9, 11). Nevertheless, recent growth in cigarette use cannot explain a trend that began in the sixties, the increase to stratospheric levels of stroke in Bulgaria and Romania.

Alcohol: alcoholic excess is also a risk factor for stroke. Until 1970, alcohol consumption rose globally, and so lost its power to explain mortality differences before that year (10). In spite of these rises, Romania and Bulgaria still consume much less alcohol than many European nations with a fraction of their stroke mortality. Alcoholism rates are more specific measures of alcohol consumption. In a small study of almost 2000 subjects in the Romanian industrial city of Craiova, an investigator found only 0.6 percent to be alcoholics (13). The Bulgarian Health Ministry reported 300,000 alcohol abusers, or four-percent (1). By comparison, the prevalence of alcohol abuse in the United States is eight percent (14).

Fat: as one would expect, countries that have experienced rises in coronary heart disease show uniform increases in fat consumption between 1961 and 1985. Conversely, countries that have experienced declines in coronary heart disease show declines in animal fat consumption. Nutrition also provides rich evidence for the search for risk factors in the Balkan stroke epidemic. Animal fat consumption (the most damaging from the standpoint of vascular disease) approximately doubled in both Bulgaria and Romania between 1961 and 1985. In Romania, animal fat consumption went on to rise from fifty-three percent to fifty-six percent of all fat between 1990 and 1994, continuing its steady increase since 1961 (16).

The detailed nutritional data for Bulgaria is very suggestive. Between 1952 and 1989, meat consumption rose from twenty-one kilograms per person-year to seventy-eight kilograms. Meat consumption had already doubled by 1965, in fact. Milk products rose from eighty kilograms to 193 kilograms. Cooking fats rose from nine kilograms to twenty-three kilograms. During the same 1952-1989 period, the consumption of bread, arguably the healthiest source of calories in most diets, declined from 264 kilograms to 192 kilograms. Fruit consumption peaked in 1966 at 162 kilograms and declined to eighty-five kilograms by 1989 (17).

One powerful indicator for nutrition's role in the decline of health in the Balkans is the rise in modern diet-related cancers between 1970 and 1993 (16, 18). The link between certain cancers of the digestive system and a modern diet (more meat, less vegetables) is widely accepted (19). A rise in such cancers tends to confirm that the Bulgarian diet has become more modern, without reference to data about actual habits, which are not available. Far from being a traditional source of calories, consumption of meat has risen, and vegetables declined, only since the 1950's. Despite all these changes, Romania and Bulgaria never consumed as much animal or vegetable fat as countries with far less stroke such as the United States, the United Kingdom, or France (15).

The important conventional risk factors that remain are blood pressure, serum cholesterol, and diabetes. There have only been a few incomplete studies of such risk factors, all in Bulgaria. One was the Countrywide Integrated Non-communicable Diseases Intervention (CINDI) that the World Health Organization organized in the middle 1980's. Another was the Sofia Cohort Study (1989-1992). In these studies, neither blood pressures nor serum cholesterol differed from western populations' (9). A more limited investigation in 1995 had similar findings as did more thorough ones in nearby countries (20; the MONICA study - see 2). When the Bulgarian government issued a report in 1995 on the nation's health, it represented the rate of diabetes in Bulgarian men as 1.74%, extremely close to studies conducted in the west of diabetes prevalence (1, 21).

There have also been some limited investigations of the type of strokes occurring in Bulgaria. A contemporary stroke study in Varna suggests high rates of hemorrhagic stroke versus ischemic stroke, up to thirty-five percent. A study in Turnovo found the more expected (because closer to the rest of the world) seventy-seven percent rate of ischemic stroke (9). The implication of the Varna study is that strokes in Bulgaria are unusually injurious (hemorrhagic are more catastrophic than ischemic), thereby increasing fatality rates. However, its significance is questionable because the study is unpublished and accurate diagnosis of strokes requires exactly the technology in shortest supply in Bulgaria, computed tomography.

A validation study (1979-1980) to determine if stroke rates are inaccurately registered found that strokes are probably underreported, because only the immediate cause of death officially counts as the actual cause of death (9). Someone who dies from pneumonia after a stroke because he can no longer cough up secretions, would be missed, for example (a common scenario). Though this study's methods have been questioned, one must remember that the Balkan Stroke Epidemic has affected not only Bulgaria, but also neighboring Romania, Czechoslovakia, Hungary, Poland, Ukraine and the former Yugoslavia. Serious artifacts seem unlikely in light of so many countries' in one region reporting high attack rates.

Therefore, the data show that the Balkan Stroke Epidemic is real. Though it is related to circulatory disease in general, conventional explanations of pollution, smoking or diet, do not adequately explain the epidemic. If only diet, alcohol, and smoking were responsible, the Balkans should have no more stroke than the rest of Europe.

DISCUSSION OF HISTORY

Romania and Bulgaria have been among the poorest nations in Europe since they became independent from Turkey at the end of the last century. Though these countries have experienced quite different histories since then, their positions in the Balkan economic hierarchy have hardly changed. In the

early 1970's, Romania experienced the fastest growth of any European nation (22). Yet, its growth did not affect its position in the regional hierarchy. For example, Romania's gross national product per capita was eighty-six percent that of Bulgaria's during the period 1925-1930. By 1991, it had declined to seventy-three percent of Bulgaria's, not a great change in the ratio of GNP/capita considering the passage of sixty-one years and the two countries' completely different political economic developments. Likewise, Bulgaria had seventy-one percent of Greece's gross national product per person between 1925 and 1930. In 1991, it had sixty-two percent of Greece's GNP per person, still a small change in the ratio of the two countries' GNP/capita (data from 23).

Before World War I, eighty percent of Bulgaria's economy and seventy-five percent of Romania's was agrarian. Both countries experienced rapid growths in their population as part of the world's demographic transition, but also a fall in agricultural prices as trains improved the means of supplying cities with food. Bulgaria's land consisted of small peasant holdings while Romania's, of large estates worked by sharecroppers (24).

In Romania, despite efforts at redistribution, estates greater than 247 acres controlled fifty-five percent of the land. More tellingly, eighty-five percent of the peasants had no land, had to rent additional land, or had to find additional work to feed themselves. Though concentration of ownership might have brought economies of scale to agriculture, owners instead rented the land to stewards who had no long-term interest in the yield and sought rapid amortization of their investments. Though Romania industrialized the fastest, by 1914 only 1.5 percent of its national wealth was industrial, and more than seventy-five percent of its exports were agricultural products (24).

In Bulgaria on the other hand, large estates accounted for only five percent of the land. Seventy percent of the population possessed the five acres that was thought necessary to support a family. Despite this, by 1900, only ten percent of peasants owned plows. Because children divided inherited land, plots remained small. Bulgaria's absence of coal and iron reserves hampered its industrial growth (24). As late as 1963, Bulgaria wasted twenty percent of its national investment on the Kremikovtzi Metallurgical Combine because it started the project in an area particularly difficult to supply with coal and iron. Some coined the project "the graveyard of the Bulgarian economy (22)."

All the Balkan capitals grew, but at a price, since foreign debt financed the growth. Only a small portion of the population enjoyed it: when Bucharest and Sofia built streetcars at the turn of the century, their fares were so high that most could not afford them and they became the transportation of the wealthy. Largely due to projects like these, interest on the national debt in 1914 consumed twenty to thirty percent of the national revenue of Bulgaria (24, 25). Yet, while only a fraction of Bulgaria benefited from the debt, the majority was paying fifteen to twenty percent of their

income for taxes to finance it. The pressure valves for these hardships were few. Such countries might have exported more people to the United States than they did, but quotas there were restrictive. In 1907, Romania put down a peasant revolt only after ten thousand lives had been lost (24).

Why the Balkan states were so far behind Western Europe is a matter of much speculation and debate. The inability of the land to support population increases seems to have hampered them even before the Turkish conquest. These increases might have otherwise caused the growth of cities and the expansion of an urban merchant class, two elements critical to Western-European prosperity (25). The role that Turkish domination played, however, is controversial. After independence, the Balkan countries used any investment they received to expand their capitals and an urban professional class, none of which benefited their overall economic situation (24). The transition to state socialism did not improve these economic realities. As each successive regime came into being, power drifted more to secret cabals and the security services. Many citizens of these countries came to view politics as equaling “lawlessness, mendacity, and opportunism (22).”

In Romania, where the government might have benefited from its “marginal advantage” in agriculture within the Communist sphere of trade, it chose to industrialize in the Stalinist manner, which supposedly cost it its friendship with the Soviet Union. Though it became the second largest agricultural producer in the Communist world after the Soviet Union, it remained the least productive or mechanized. Collectivization only petrified this inadequacy (22).

On the other hand, Bulgaria reportedly “played ball” within the Soviet system (Council for Mutual Economic Assistance). Yet in the 1980’s, Bulgaria seemed to rely on the international drug and arms trade to defray its hard currency debt. In both countries, the development of heavy industry with a relative neglect of agriculture produced high cost, low-quality goods (22).

DISCUSSION OF HEALTH CARE

Against this background of economic stagnation, the Communist countries elaborated ideologies that favored health equality, but they had no means to implement it. Top levels of government decided health allocations that were in these circles most likely to perish in the face of military and strategic goals (5). In Bulgaria, elites have wasted no time repudiating all connections to this past system of state-controlled and state-financed health care delivery. Some have endorsed a system of national health insurance, which would move Bulgaria in the direction of fee-for-service payment (26).

Initially, the health problems of eastern populations were responsive to the efforts of Communist governments. They made progress against infections for example. Nevertheless, in the middle-sixties there was a turning point.

Men began to die at higher rates from chronic disease, while at the same time they seemed to miss many of the benefits that modern medicine brought to west European nations (5, 27).

Eastern Europeans constructed hospitals for efficiency, not free-market competition. Their services suggest a “pyramid,” with most facilities’ providing only a few services. Above those are institutions that provide additional services. Finally, at the tip of the “pyramid,” there are elite institutions that provide all services available, and which are located only in the largest cities. In the United States by comparison, hospitals suggest a “diamond” because most hospitals (the widest middle part of the diamond) provide most available medical treatments (7). The cheaper “pyramid” system appears to have limited access to health facilities in Bulgaria (28).

Each country had its special challenges in the health domain after the war to which it applied its brand of socialism. In Bulgaria, for instance, the rural/urban prosperity gap was enormous, the product of economic policies of the previous fifty years. Initially, the Communist regime enjoyed some success at minimizing the effects of this disparity on health. Then rural health declined, and now premature death in rural males is rising faster than in urban ones. In addition, services are far better in the city than in the countryside. For example, post-neonatal mortality (a parameter tightly linked to hospital availability) is forty-nine percent higher in rural areas than urban ones (5). Bulgaria at first enjoyed gains by increasing access to existing institutions: after this, it did very little. One old measure was to make rural service compulsory for physicians. Anyone forced to go there clearly wasted no time departing, since only seven percent of Bulgaria’s physicians serve rural areas, though a third of the population resides there (28).

The Communist Party probably acted as a break against progress in the reduction of the urban/rural health differential, in that its party members always concentrated in the capital. In this sense, the party provided continuity with Bulgaria’s past by favoring center over periphery. For example, at a meeting of the United States Agency for International Development, America endeavored to provide emergency aid to Bulgaria in the 1996-1997 hyperinflation period. According to the minutes of that meeting, a Ministry of Health official continued to press for the provision of all available aid to Sofia, despite most evidence’s suggesting that rural areas were the worst affected by the economic downturn. Fortunately, USAID ignored his recommendation (29).

The rural inhabitants of Romania face similar hardships to their Bulgarian counterparts. Though true that in only five of forty-one counties (“judeti”) are rural inhabitants likely to live longer than in urban ones, countywide differences are more significant than rural/urban ones. For example, five of the six counties with the fewest hospitalizations are also amongst the ten counties with the shortest life spans. Of the ten counties with the worst circulatory disease mortality (part of which is strokes and part heart attacks), only one ranks in the top ten in hospitalizations. Likewise, only one

county among the bottom ten in life span is amongst the top ten in hospital beds. Of the five counties with the fewest pharmacists, four are among the ten with the shortest male life span (30). Clearly, the same issues of regional misallocation and worsening of the gap between undeserved and over-served areas, apply in Romania.

Unlike Bulgaria, Romanian socioeconomic development does not correlate well with health status. The poorest counties in Romania are Giurgiu, Calaresi, Vaslui, and Botosani, each of which has GNPs per capita of less than \$2500. However, the counties with the shortest life spans are Satu Mare, Salaj, Maramures, and Bihar (28, 16).

An unspoken risk factor remains to be addressed, inadequate health care. In fact, health care remains the best explanation for changes in stroke death rates in the Balkans. In addition, there is a positive correlation between high infant mortality in the Balkans and high stroke rates, which is a “smoking gun,” since infant mortality is closely related to health care access. Romania and Bulgaria have among the highest infant mortality rates in Europe.

After World War II, as we have seen, Bulgaria and Romania had great success in reducing death due to infectious disease early in life (28). At the time, they suffered from similar rates of stroke as western countries. The west was able to nullify the increased risks of chronic disease due to lengthening life spans, modern diets, and sedentary lifestyles, with better medical management of hypertension and diabetes. The Communist countries were less and less able to cope with evolving challenges. Their centralized health care systems and total absence of democratic responsiveness allowed military goals and other priorities determined exclusively in these nations’ Communist-dominated capitals and central administrations, to subordinate ideals of health equality (5). West and east separated further, until the poorest nations could not rise to the task of effectively managing chronic disease. This is why their elevated infant mortality (relationship to health care clear) correlates with their elevated rates of stroke (relationship to health care indirect).

Infectious disease proved more amenable to the Communist system of centralized decision-making. Bulgaria and Romania implemented vaccination programs with near one hundred percent compliance rates, in fact. However, chronic diseases required physicians’ seeking patients, hospitals’ being built, and government’s assuring access for the least able to transport themselves to a doctor. The Russian model of health care, in which physicians are responsible for a certain geographic area, had neither the incentives nor the checks necessary to ensure that physicians see the sickest patients. For example, no screening exists for hypertension and therefore there is no intervention in early phases before the elevated pressure damages blood vessels in the brain and heart.

After the fall of communism, hyperinflation and economic instability viciously struck those most vulnerable to stroke, the aged, whose stroke

rates have risen with the rest of the Balkan population. In 1991, half of all pensioners in Romania were living beneath the subsistence level, for example (4).

The supply of medicines, though theoretically guaranteed in both countries' systems of health care, varies. Bulgaria provides scrip that private pharmacies reject because of late reimbursement. The same problem occurs in Romania. Romania spends only six dollars per person on medicine every year (31). Despite the fact that Romania makes half of the country's drug products domestically at low prices, this seems like an extremely small sum. Bulgaria spends almost the same, eight dollars (32). By comparison, France spent 309 dollars in 1993, the United Kingdom 181 dollars (33).

There is another stress on Bulgaria's health care system that would explain its rapidly declining ability to meet the needs of its population in the last decade, the flow of the aged to the countryside (28). These people suffer from more illnesses, and therefore have greater need for medical attention, than the younger people they left behind in the city. Yet as we have seen, the old are less likely to receive adequate care in rural areas. This flight of the elderly to the countryside is a response to the disproportionate effect economic inflation has on fixed incomes (4).

CONCLUSIONS

Romania and Bulgaria modernized since World War II like Western Europe. Their populations consumed more animal fat, they ate fewer grains and vegetables, and they became more sedentary (1, 17). Their health systems made inroads against infectious disease, benefiting children. When the population (like the rest of the developed world) began dying from chronic conditions instead of acute ones, it turned to a health infrastructure that was not up to the task of providing adequate care.

The transition to democracy that has bestowed political freedom on the Balkan nations has also devastated them economically (16). So while their health system might serve them a little better with some "co-payments," they do not have the money to spare. As a result, Romanians and Bulgarians have not only died at higher rates; those that live are in miserable health. In Svishtov, Bulgaria, for example, investigators in two separate surveys (1992 and 1993) could find no woman over eighty-five free of disabilities. Only about ten percent of the men living at eight-five were disability-free (34, 35). The comparable figure in the United States is *sixty-five percent* (36).

Romania, a country that historically had an impoverished agricultural sector, attempted to industrialize but could not compete in world markets. Under such conditions, its centralized regimes apparently could not preserve health budgets against military or industrial priorities (5).

Bulgaria faced many of the same problems. It had historically ignored its

rural population in favor of its urban one, a problem that the concentration of the Communist Party in the capital did nothing to correct. It wasted resources in industries in which it had no advantage, and Bulgarian health budgets seem to have fared no better in centralized decision-making than Romanian ones. Neither state responded adequately to evolving challenges, despite an ideological commitment to progress and equality (5, 22).

Hypertension, diabetes, and atherosclerosis developed no faster in these Balkan populations than in western nations. However, a pyramidal system of resource allocation and Soviet method of geographic assignment of physicians was good for sparingly distributing resources, not for ensuring management and follow-up for the millions with these conditions. They might be half the adult population, if they are similar to the Americans (37).

The dislocation caused by democratization has repaid Bulgarians and Romanians cruelly for their faith in the democratic philosophy. They will continue to adopt modern lifestyles, so lasting improvements must come from a reversal of the pattern of a century, uneven distribution of health care, as well the reversal of the pattern of only three decades, the incomplete management of chronic conditions.

Reliable direct knowledge of risk-factor prevalence is absent, and so data from the First Teaching Hospital in Sofia will be particularly welcome when it becomes available (Choudomir Nachev, personal communication, July 19, 1996). Until then, the medical community has to consider whether it has a moral obligation to assist the Balkan nations in building their "health care capital (38)." The Balkan countries' own governments have focused on military priorities just as they did before the adoption of democratic reforms. For example, they have aggressively pursued incorporation to NATO. There is no reason why people who are knowledgeable about the hardships in that region, like the Balkan Stroke Epidemic, have to accept this. The former Communist countries chose a free market system and democratic reforms on faith: we might reward their faith in our way of life, by using strategically invested foreign aid to move them to our state of health.