

# **Nutrition and Stroke**

## **Prevention and Treatment**

**Salah Gariballa** MD, FRCP

*Clinical Senior Lecturer, The University of Sheffield and Barnsley Hospital,  
Sheffield Institute for Studies on Ageing, UK*



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Publishing

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Editorial Offices:

Blackwell Publishing Ltd, 9600 Garsington Road, Oxford OX4 2DQ, UK

Tel: +44 (0)1865 776868

Blackwell Publishing Professional, 2121 State Avenue, Ames, Iowa 50014-8300, USA

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Tel: +61 (0)3 8359 1011

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First published 2004 by Blackwell Publishing Ltd

Library of Congress Cataloging-in-Publication Data

Gariballa, Salah.

Nutrition and stroke : prevention and treatment/Salah Gariballa.

p. cm.

Includes bibliographical references and index.

ISBN 1-4051-1120-8 (alk. paper)

1. Cerebrovascular disease-Nutritional aspects. 2. Cerebrovascular disease-Diet therapy.

3. Cerebrovascular disease-Prevention. I. Title.

RC388.5.G37 2004

616.8'10654-dc22

2003069155

ISBN 1-4051-1120-8

A catalogue record for this title is available from the British Library

Set in 10/13pt Palatino

by DP Photosetting, Aylesbury, Bucks

Printed and bound in India

by Replika Press Pvt Ltd, Delhi

The publisher's policy is to use permanent paper from mills that operate a sustainable forestry policy, and which has been manufactured from pulp processed using acid-free and elementary chlorine-free practices. Furthermore, the publisher ensures that the text paper and cover board used have met acceptable environmental accreditation standards.

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This work is dedicated to my parents, my wife Nesrin and my children  
Mohammed, Samar and Muaz



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# Preface

Nutrition as a science was founded by Antoine Lavoisier towards the end of the eighteenth century, but dietetics is a much older subject. Hippocrates frequently gave his patients advice about what foods they should eat, and since the days of ancient Greece, doctors in all countries have used dietetics as an important part of their treatment. From a nutritional point of view mankind can be divided into four types: (1) primitive hunter-gatherers, (2) peasants, agriculturists and pastoralists, (3) urban slum dwellers and (4) the affluent.

There are not many primitive hunter-gatherers in the world today, but societies depending on these methods were fairly common until the early part of the twentieth century. The few hunter-gatherers left nowadays live largely on vegetables and fruit with little animal food. An example is the Kung Bushmen who live in an isolated area of northern Botswana. Truswell (Truswell & Ward 1979) studied their nutrition and reported that they were rarely obese and, at the end of the dry season, tended to become undernourished. Except after illness or injury they did not experience malnutrition.

Agriculturists and pastoralists are people who stay in one place, build homes and store treasure. Great civilisations like the Egyptian, the Mayan and the classical Greeks were based on agriculture. Nutrition in this setting has fundamental differences from that of the hunter-gatherers. Peasant agriculturists were liable to develop specific deficiency diseases when a large proportion of their dietary energy came from a single staple food, such as a cereal or starchy food.

New urban dwellers were uprooted from their rural origins and packed round the factories in bad housing. Barbara Ward in 1969 described this new migrant population, crowded into towns of Africa, Asia and Latin America. Millions pile on top of one another, and the farms cannot feed them or the industries employ them. They have the worst of both worlds – old rural traditions are lost but they do not benefit from being in an urban setting.

In affluent societies such as Britain today, the malnourished segment of the community is no longer babies, who in fact tend to be obese, but some of the elderly, especially those who are failing physically or mentally. Affluence creates its own nutritional problems, and nutrition has some part to play in the genesis of diseases such as hypertension, coronary heart disease, stroke, diabetes mellitus, gallstones and cancer. Florence Nightingale wrote in her *Notes on Nursing*, published in 1859: 'Remember that sick cookery should half do the

work of your patient's weak digestion. But if you further impair it with your bad articles, I know not what is to become of him or it. If the nurse is an intelligent being, and not a mere carrier of diets to and from the patient, let her exercise her intelligence in these things.'

Hippocrates documented stroke in his first account of the syndrome, using the original ancient Greek word 'apoplexia'. This implied 'being struck down violently, perhaps by lightning or a thunderbolt', and, as the Swiss doctor Wepfer discovered in 1658, mainly occurred in elderly people. Perhaps it also occurred in some, like Florence Nightingale's patients, with the sickest cookery and weakest digestion.

*Salah Gariballa*

Truswell, X. & Ward, X. (1979) Historical perspective. In *Human Nutrition and Dietetics*, pp. 1-5. Churchill Livingstone, Edinburgh.

# Acknowledgements

I wish to express my deepest gratitude to all those who helped me with planning and carrying out the studies I have quoted in this book. Special thanks are given to the subjects who participated in these studies.

I would like to thank all the copyright holders who have kindly granted permission for their material to be used in this volume. Acknowledgements for figures and tables have been noted within the text. I would like to acknowledge here those publishers who have kindly allowed me to adapt sections of text from their publications:

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# Abbreviations

AMC	Arm muscle circumference
ANOVA	Analysis of variance
BMI	Body mass index
BMR	Basal metabolic rate
BSF	Biceps skin-fold thickness
CHD	Coronary heart disease
CHI	Creatinine–height index
COMA	Committee on Medical Aspects of Food Policy
CRPs	C-reactive proteins
CSF	Cerebrospinal fluid
CVD	Cardiovascular disease
DoH	Department of Health
DXA	Dual-energy X-ray absorptiometry
EAR	Estimated average daily requirement
FAO	Food and Agriculture Organization
Fe	Iron
HDL	High density lipoprotein
HPLC	High performance liquid chromatography
ICAM-1	Intercellular adhesion molecule-1
IHD	Ischaemic heart disease
K	Potassium
LBM	Lean body mass
LDL	Low density lipoprotein
MAC	Mid-arm circumference
Mg	Magnesium
MNA	Mini nutritional assessment
NHANES	National Health and Nutrition Examination Survey
NHS	National Health Service
NMDA	<i>N</i> -methyl <i>D</i> -aspartate
NSAID	Non-steroidal anti-inflammatory drug
PACI	Partial anterior circulation infarct
PEG-tube	Percutaneous gastrostomy tube
PEU	Protein-energy undernutrition
Q1–Q3	Inter-quartile range
RDA	Recommended dietary allowance

SCALES	(S = Sadness; C = Cholesterol; A = Albumin; L = Loss of body weight; E = Eat; S = Shopping)
SD	Standard deviation
SENECA	Survey in Europe on Nutrition and the Elderly
TBARS	Thiobarbituric acid reactive substances
TBW	Total body water
TLC	Total lymphocyte count
TSF	Triceps skin-fold thickness
VCAM-1	Vascular cell adhesion molecule-1
VWF	Von Willebrand factor
WHO	World Health Organization
Zn	Zinc

# I

# Nutrition and Ageing



# 1

# The Challenge of Stroke

## 1.1 Definition

A stroke is defined as rapidly developing clinical signs of focal and, at times, global loss of cerebral function with symptoms lasting more than 24 hours or leading to death and with no apparent cause other than that of vascular origin (World Health Organization 1971).

## 1.2 Epidemiology

The incidence of stroke is strongly age-related, with a hundred-fold increase in incidence rates, from about 3 per 10 000 people in the third and fourth decades to almost 300 per 10 000 in the eighth and ninth decades (Bonita 1992). In other words, more than 75% of strokes occur in people aged above 65 years. The majority of strokes (about 80%) are due to cerebral infarction, 10% are due to primary intracerebral haemorrhage, 5% due to subarachnoid haemorrhage, and in 5% the cause is uncertain (Warlow et al. 1996).

## 1.3 The burden of stroke

Stroke is a common and devastating event, which often results in death or major loss of independence, with immense human and financial costs. Approximately 125 000 and 500 000 new or recurrent strokes occur each year in the UK and USA, respectively, accounting for around one in ten of all deaths. However, the majority of strokes are not fatal, and the major burden is long-term disability. Stroke is the third most common cause of death in most Western populations after ischaemic heart disease (IHD) and cancer (Warlow et al. 1996). It is thus the commonest life-threatening neurological disorder, and the resulting disability is the most important single cause of severe disability among Western people living in their own homes (Martin et al. 1988). It is also the second most common cause of dementia, the most common cause of epilepsy in the elderly, and a frequent cause of depression. Stroke in the developing world is less well documented; however, reports from the Asia-Pacific Consensus Forum on Stroke Management predict that 'In the next 30