

Hydration in the Prevention of Recurrence of Thrombotic Stroke

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ABSTRACT

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The role of fluid balance in health and disease management is discussed. The option of faster recovery in stroke patients with more attention to fluid therapy has been noticed. This concept was tested with a clinical trial in this paper. The relevant literature has been reviewed.

Keywords: Fluid balance, Hydration therapy, Stroke.

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INTRODUCTION

Proper hydration is not emphasized in routine life. Doctors insist on hydration, only when some one has UTI or Ureteric colic or when somebody suffer from diarrhea. Care is also taken to restrict fluid in kidney and heart diseases. Other groups of patients and healthy subjects seldom care about hydration. In the literature of modern medicine there is no much reference in this regard. But references are in plenty on fluid and electrolyte balance. In Ayurveda there are mentions about fluid consumption and use of water in health and diseases. We naturally take fluids when body needs it. The intracellular, interstitial and intravascular compartments are capable of exchanging fluids among them according to the need. After a tiresome journey all of us prefer a glass of plain water than anything else. If we get a chance we would like to have a bath also. This natural behaviour has some curative effect on fatigue and boredom. In the 6th century AD French & German physicians were treating patients with water, Paralyzed patients were immersed on their affected side in bathtubs. Steaming ,bathing and drinking water were the other modalities that prevailed in these countries those days.

The basis for this article was the observation of very dramatic recovery of three patients from amnesia and one from unconsciousness after fluid therapy. Amnesia patients took fluid orally and the other was given IV fluid. These patients did not have any other illnesses, They were above 75 yrs age, their biochemical parameters and hemogram were normal, they were not

epileptic and they lived uneventfully after this episodes. All the four did not take adequate fluid prior to this illness.

This experience was put in to a clinical application in the management of thrombotic stroke. A group of patients who showed rapid improvement after the stroke were subjected for this study.

REVIEW OF LITERATURE

In the body the source of water are

1. The various oxidative reactions which evolve 150 ml of water
2. The water content of solid food consumed amounting to 1/3 of its wt

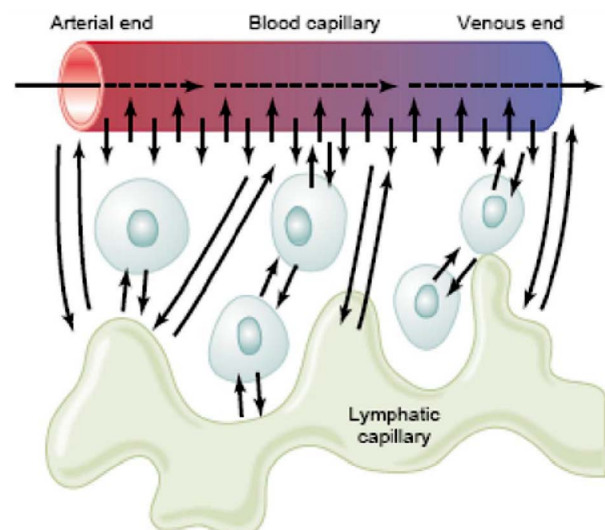


Figure 1. Fluid microcirculation in the periphery

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3. The consumed water amounting to 1500 ml

Altogether 2500 ml water is required for a healthy person a day. When the quantity of food consumption comes down in old age, the quantity of body water may fall and problem related to tissue dehydration may arise if he is not compensating it with oral fluids.

MATERIALS AND METHODS

The study was conducted in three different stages, in two groups of patients and one group of healthy volunteers. Inclusion & exclusion criteria were the same in both groups of patients.

Inclusion Criteria

- Classic Hemiplegia
- Other Hemispherical syndromes
- Acute onset amnesia

Exclusion Criteria

- Brain stem syndromes
- Cardiac arrhythmia
- ECG suggestive of old MI
- Patients with cardiac murmurs
- Paraproteinemia
- Myeloproliferative disorders
- Secondary Polycythemia
- Suspected neoplasia

1. A group of 300 thrombotic stroke patients were selected for the study by pure clinical evaluation. The study period was 1995 to 1999 and only basic investigations were done in these patients. They included-

Routine blood examination to exclude polycythemia & leukemia

- Blood sugar
- Serum cholesterol
- Renal function test
- Serum proteins-to exclude paraproteins
- Thyroid function
- X-ray & ECG

No other investigation was possible in this group

In this group of patients high ESR and high hematocrit values were subjected to further evaluation. Those who showed an improvement in muscle power to 3/5 in the first seven days were followed up for 12 months.

Daily intake of 2500 ml fluid was ensured apart from the medicines.

Out of the 300 clinically diagnosed cases 128 cases were excluded (-80 kidney diseases & 48 heart diseases). In the remaining 172 cases treatment protocol was the same.

Total number of patients	300
Antecedent illness	
Renal (creatinin >1.40)	80
Heart disease	48
Paraproteinemia	nil
Total Exclusion	128
Total number included in study	172

Antiplatelet drugs not given to any one. Those who had cholesterol above 150 mg/dl were given simvastatin 10 mg/dy, but only 32 continued the drug. Diabetes & Hypertension were treated to optimum control. Out of these 172 cases 60 had recurrence of stroke and all the 60 were defaulters in taking fluid. The percentage of recurrence in this group is 34.8.

2. A second group of 197 patients were studied in another setup during the period 2005 to 2007 with the Same inclusion and exclusion criteria. They were subjected to all investigation including CT/MRI brain and ECHO cardiogram.

- Investigations
- Haemogram
- Renal function & electrolyte
- Blood sugar
- Serum protein
- Fasting lipid profile
- X ray chest, ECG, ECHO cardiogram
- CT & MRI brain

Six had hemorrhage and five had hemorrhagic infarct in this clinically suspected thrombotic stroke. Treatment protocol included antiplatelet drugs also. No defaulters of drugs in this group. Out of the 197, eighty eight were excluded and 29 out of the 109 follow up had recurrence . Twenty seven out of these 29 were defaulters in taking oral fluids. Recurrence in this group is 26.6.

3. A third group of healthy volunteers above the age of 55 yrs were groomed for a study. Body weight, blood pressure, blood sugar and lipids were brought to normal. They were instructed to take 2500 ml oral fluid

a day. Observation period was January 2003 to 2008 January. Of the 54 death in this group only 5 died of stroke'

Number of healthy volunteers: 120

Duration of observation: Five years

Causes of Death			
Stroke	MI	Others	Total
5	23	26	54

Table 1. Age distribution of death and survivors	
Age Group of death	
< 60	5
> 60	7
> 70	22
> 80	17
> 90	3
Age Group of survivors	
60-65	29
66-75	14
76-85	14
>86	8
>90	1
Stroke	1
MI	1

OBSERVATIONS

Antiplatelet medicine has its unquestionable role to prevent recurrence in thrombotic stroke

Hydration has an equally important role in the prevention of recurrence of stroke and to maintain normal brain activities in otherwise normal elderly people.

The age group mostly affected in thrombotic stroke is 75 to 85 yrs.

Those patients who show improvement in the first week of illness are the luckiest

DISCUSSION

All the cells in human body receive their nutrition from the interstitial fluid. Neurones require a very rich supply of nutrients. its glycogen storage is very poor. To maintain the nutritional requirement, the autoregulation (meta arteriolar sphinctor mechanism) permits 75 ml of blood flow to 100 gm of gray matter/ mt. Interstitial fluid is formed from the capillaries by diffusion.

Total surface area of capillary all over the body comes to 70 meter square. From the capillaries plasma with its nutrients diffuses in to the space through the slit pores and vesicular channels of the capillary endothelium. When this is not effective due to atherosclerosis of the cerebral vessels or reduction in the blood volume by various causes the cells will be deprived of adequate nutrients through interstitial fluid. The blood flow to brain is influenced by the blood volume, viscosity and peripheral resistance. Lipid soluble substances like O₂ and CO₂ can diffuse through any part of the capillary unlike ions and water. Ninety percentage of the interstitial fluid diffuses back to capillary at its venous end and come back to the pool of intravascular compartment and contribute to be the blood volume. Probably this physiology is not very effective in elderly people unlike the youngsters where either the quality or the quantity of interstitial fluid is inadequate to nourish the neurons.

A survey conducted in a group of 4000 adults above the age of 45 yrs revealed that 85% of them take only 4 to 6 glasses of water a day. When the quantity of solid food consumed also is low in old age the total body water may fall and tissue perfusion may suffer which can precipitate stroke by deprivation of nutrients to cells.

CONCLUSION

Proper hydration has a role to play in tissue perfusion. In old age the changes in physiology renders the tissues more vulnerable to damage due to dehydration.

END NOTE

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Conflict of interest: None declared

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