ETHICAL REVIEW COMMITTEE, ICDDR,B.

Date 26/11/84

Principal Investigator _____ Trainee Investigator (if any) GO

Application No. 84-011(Revised + Corrected) Supporting Agency (if Non-ICDDR,B) _____

Title of Study "MAGNESIUM BREATH-HYDROGEN TEST FOR THE ESTIMATION OF GASTRIC ACID PRODUCTION IN ADULT BANGLADESHI VOLUNTEERS".

Project status:
( ) New Study
( ) Continuation with change
( ) No change (do not fill out rest of form)

Circle the appropriate answer to each of the following (If Not Applicable write NA).

1. Source of Population:
   (a) Ill subjects — Yes (No)
   (b) Non-ill subjects — (Yes) No
   (c) Minors or persons under guardianship — Yes (No)
2. Does the study involve:
   (a) Physical risks to the subjects — Yes (No)
   (b) Social Risks — Yes (No)
   (c) Psychological risks to subjects — Yes (No)
   (d) Discomfort to subjects — (Yes) No
   (e) Invasion of privacy — Yes (No)
   (f) Disclosure of information damaging to subject or others — Yes (No)
3. Does the study involve:
   (a) Use of records, (hospital, medical, death, birth or other) — Yes (No)
   (b) Use of fetal tissue or abortus — Yes (No)
   (c) Use of organs or body fluids — (Yes) No
4. Are subjects clearly informed about:
   (a) Nature and purposes of study — (Yes) No
   (b) Procedures to be followed including alternatives used — Yes No
   (c) Physical risks — Yes No
   (d) Sensitive questions — Yes No
   (e) Benefits to be derived — Yes No
   (f) Right to refuse to participate or to withdraw from study — Yes No
   (g) Confidential handling of data — (Yes) No
   (h) Compensation &/or treatment where there are risks or privacy is involved in any particular procedure — Yes No
5. Will signed consent form be required:
   (a) From subjects — (Yes) No
   (b) From parent or guardian (if subjects are minors) — Yes (No)
6. Will precautions be taken to protect anonymity of subjects — (Yes) No
7. Check documents being submitted herewith to Committee:
   - ✓ Umbrella proposal - Initially submit an overview (all other requirements will be submitted with individual studies).
   - ✓ Protocol (Required)
   - ✓ Abstract Summary (Required)
   - ✓ Statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (Required)
   - ✓ Informed consent form for subjects
   - ✓ Informed consent form for parent or guardian
   - ✓ Procedure for maintaining confidentiality
   - ✓ Questionnaire or interview schedule *

   * If the final instrument is not completed prior to review, the following information should be included in the abstract summary:
   1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.
   2. Examples of the type of specific questions to be asked in the sensitive areas.
   3. An indication as to when the questionnaire will be presented to the Cttee. for review.

We agree to obtain approval of the Ethical Review Committee for any changes involving the rights and welfare of subjects before making such change.

D. + Tiahrens
Principal Investigator

Trainee

REVISED PROTOCOL

SECTION 1 - RESEARCH PROTOCOL

TITLE: MAGNESIUM BREATH-HYDROGEN TEST FOR THE ESTIMATION OF GASTRIC ACID PRODUCTION IN ADULT BANGLADESHI VOLUNTEERS.

PRINCIPAL INVESTIGATOR: Dr. G. H. Rabbani

CO-INVESTIGATORS: Dr. F. Van Loon, Dr. David Sack, Dr. C. Stephensen.

STARTING DATE: January 1985

COMPLETION DATE: December 1985

TOTAL INCREMENTAL COST: US $ 12,337.00

SCIENTIFIC PROGRAM: This protocol has been approved by the HOST DEFENST WORKING GROUP.

W.B. [illegible]

PROGRAM HEAD

Date: 15.01.84

ABSTRACT:

A new simplified (tubeless) test to determine the gastric acidity in man will be evaluated in 20 healthy adult volunteers in Bangladesh. This technique has previously been tested in American Volunteers. An oral dose of 150 mg of metallic magnesium will be given in subject pre-stimulated with Histalog and the concentration of hydrogen gas (liberated from the reaction between magnesium and hydrochloric acid) in exhaled air will be determined. The correlation between breath hydrogen gas and gastric acid (sampled by intubation) will be examined. Previous studies in animals and human volunteers have proven the safety and efficacy of the test. When validated and standedized, the test will be useful for basic studies of gastric acid function and for determining the natural history of achlorhydria in populations at risk for diarrheal diseases.

(a) Research involving human subjects: _____

(b) Research Review Committee: _____

(c) BMRC: _____

(d) Director: _____

(e) Controller/Administrator: _____

SECTION II - RESEARCH PLAN

Objective:

To validate a new simplified technique to measure gastric acid production in healthy, adult Bangladeshi volunteers using a magnesium breath hydrogen test.

Background:

Gastric acid acts as an important barrier to enteric infections, low gastric acid production is therefore associated with much higher risk for cholera and E. coli diarrhoea in developing countries and may be one of the links in the malnutrition diarrhoea cycle (Gitelson 1971, Giannela et al 1972), Pasricha 1940). In preliminary data on humans from Dhaka, Sack and associates (1969) showed a high prevalence of achlorhydria in patients with cholera. However, Cash et al (1970) reported one achlorhydric patient out of 16 tested with cholera in Dhaka. Nalin et al (1978) reported that fasting and post prandial stomach acid production were low in 16 of 37 Bangalee patient convalescing from cholera. In spite of the importance of gastric acid, measurement of acid production is infrequently performed, because of technical reasons. "Tubeless" tests have been developed in the past, however they have not been ideal. The "Diagnex blue" test has been abandoned because of its unreliability and the "Technitium scanning" method needs radio-active material, is expensive and has not been validated (Samloff et al 1975). We propose to evaluate a new test for measuring gastric acid, an oral magnesium breath test, which has been successfully and safely tested in animals and human volunteers in US (Sack et al, 1983 to be published). The basis for the test is the reaction of magnesium with gastric hydrochloric acid to liberate hydrogen gas which is rapidly absorbed into the circulation and is excreted in the breath. When no acid is present, only very small amounts of H_2 are liberated very slowly and there is only a

small increase in breath hydrogen. This small increase is due to the slow reaction of magnesium with water at neutral or alkaline pH's. The amounts of hydrogen evolved in vitro at pH 1 and pH 7 are shown in Figure One.

Breath-hydrogen tests were originally developed to detect sugar malabsorption which depends on fermentation of unabsorbed sugar by the colonic bacteria to produce increased concentration of hydrogen gas in the expired air. In contrast the magnesium test depends only on gastric acid, and does not require bacterial fermentation.

Safety of Magnesium:

Magnesium is an essential dietary constituent, the daily recommended allowance being 350 mg for adults. We feel that use of magnesium metal in man will be safe based on a review of the literature regarding the biochemistry of magnesium and the animal and human tests that have been carried out. We have selected magnesium instead of other metals (i.e. zinc, iron) because it has the higher electronegative potential and will generate H_2 most rapidly. The reaction between magnesium and HCL is spontaneous and proceeds rapidly and is slightly exothermic. Since the equilibrium constant for the reaction in 10^{77}, all the metallic magnesium would be converted to divalent form (Mg ++). Unreacted metallic magnesium which did not come in contact with HCl would pass through the alkaline intestine. Being insoluble in fat and water it will not be absorbed (Mordes et al 1978). If

all metallic magnesium is converted into Mg ++, some of it may be absorbed, but still we expect no harm because magnesium salts (e.g. epsom salt) are commonly used in laxative and antacid formulations without any adverse reaction.

After ingestion of magnesium metal, gastric mucosal damage is unlikely because, the reaction of magnesium metal with acid is only mildly exothermic and heat produced by this reaction would be insufficient to cause gastric mucosal damage. Magnesium ions are not toxic within the GI tract, H_2 gas is physiologically inert and so is not toxic, and intestinal magnesium metal is insoluble and inert and is thus not toxic and will pass out in the feces. Although there have been no published studies of toxicity of oral magnesium metal, studies of subcutaneous magnesium splinters (Meek et al 1942) and of pulmonary magnesium (Gardner et al 1943) indicated no toxic effects in animals except for a limited local necrosis on S. C. injection. Finally magnesium is a common industrial metal and is not recognized to be associated with any occupational illness (Browning et al 1969).

Animal studies and safety tests in human volunteers:

Animal studies carried out in dogs have established that 500 mg of magnesium metal given via a gastric cannula consistently result in an increased breath-hydrogen concentration. When given along with intragastric hydrochloric acid similar results were obtained. Controlled study of safety testing of intragastric magnesium was carried out in 16 rabbits for 3-4 days. Autopsy

studies revealed no abnormalities of gastric or small intestinal mucosa, kidney, liver or heart in the control or test animals.

Human studies were carried out in six healthy American adult volunteers (male and female) in one study and another 5 healthy volunteers in another study at the Baltimore City Hospitals. A total of 56 separate tests have been done with human volunteers in Baltimore. Before the human trial, ethical approval was obtained from the Joint Committee on Clinical Investigation, The Johns Hopkins University School of Medicine and the Johns Hopkins Hospital, Baltimore, USA and the US Food and Drug Administration (FDA).

Each subject was given six increasing doses of oral metallic magnesium (10 mg, 50 mg, 100 mg, 150 mg and 200 mg) one dose a week and their exhaled air was sampled to determine hydrogen gas concentration by gas chromatograph. Betazole (histamine analogue) and cimetidine were used to stimulate and suppress the gastric acid production respectively. The results show that there is a dose-response relationship between the dose of magnesium ingested and the amount of hydrogen recovered in the expired air, when the amount of acid in the stomach is in excess. Subjects were screened for occult blood in the stool and no occult blood was detected.

Symptoms:

Magnesium dosage was well tolerated by the subjects and none reported GI symptoms except mild and transient heart burn in two patients (which may have been due to fasting and/or Histalog).

Serum chemistry:

To assess the liver function; total bilirubin, alkaline phosphate, and SGOT were determined before and after the test and no change was observed. Serum creatinine was also unaffected indicating no damage to the kidneys. Serum magnesium level was also unaltered in these subject. Serum calcium levels were normal. (The protocol for human volunteer study has been approved by US Food and Drug Administration (Investigational New Drug No. 20552).)

A. Rationale:

When validated and standardized the new test should offer a convenient tool with which to study the role of hypochlorhydria in population groups and in specific groups at high risk of diarrhoea. Further definition of the natural history of hypochlorhydria should suggest means of correcting this host factor deficiency and thus lead to broad spectrum protection for diarrhoeal diseases.

METHODS AND PROCEDURES:

Subjects: 20 healthy adult, volunteers (aged 18-60 yrs) of either sex will be recruited for this study. They may be drawn from the ICDDR,B staff, patients attendents, or anyone who provides an informed consent after satisfying the inclusion creteria. Only subjects who give signed informed consent after explaining the procedu-e will be admitted. Subjects with extreame malnutrition, chronic illness, previously history of peptic ulcer or gastric surgery will be excluded.

Test procedures: All subject will have both the magnesium breath hydrogen test and the standard gastric analysis performed in order to correlate the two tests. Half the patients will have the breath test first and half will have the standard done first. The two test procedures will be separated by 48 hours (one day off between tests). For both tests the subjects will fast overnight and the tests will be performed the following morning.

Revised method of oral magnesium/breath hydrogen test:

1. The test will be done in the morning.
2. 100 mg of Betazole will be given orally, diluted in 50 ml of water.
3. After the betazole is taken, exhaled air will be collected continuously for the next 2½ hours.

4. Thirty minutes after the ingestion of betazole (but within the prescribed period of 2½ hrs), 150 mg of magnesium (-50 mesh), contained in a pretested gelatin capsule will be ingested with 50 ml of water.

5. After ingestion of magnesium, each 15 minutes collection of expired air will be continued for 90 minute or 120 minute collection period as desired.

Breath collection: Breath collection will be made by having subjects wear a breathing mask (Speak Easy - II, Respironics, Inc.) which covers the nose and mouth and has inspiratory and expiratory valves built in. The inspiratory valve allows subject to breath room air. Tubing will be attached to the expiratory valve which will connect to a Y-valve. Two gas collection bags will be attached to the Y-valve so that when one is full of exhaled air the air flow may be switched to the empty bag without any interruption in breathing. Fifteen minute collections of exhaled air will be made into collection bags of 120 or 150 liters. (Most subjects breath at a rate of seven to eight liters per minute).

Measuring hydrogen concentration: A Quintron Microlyzer^{R} (Quintron Instruments, Minneapolis, MN) will be used to measure the concentration of hydrogen (microliters/liter) in samples of air removed from the bags at the end of each 15 minute

water vapor. It will be assumed that all samples are 100% saturated with water vapor (as is commonly done with samples of exhaled air). The vapor pressure of water in a 100% saturated sample varies only with temperature and these values are published (CRC Handbook of Chemistry and Physics, Chemical Rubber Co., Cleveland, Ohio). Thus the volume of dry gas collected in each 15 minute interval is found by correcting the Dry Gas Meter reading for: (1) inaccuracies of the metering process; (2) vapor pressure of water; and (3) adding back the volume of air removed to measure hydrogen concentration.

The Microlyzer^{R} dries all gas samples before they reach the sensor, so the hydrogen concentration read from the Microlyzer^{R} is for a sample of dry air. Thus when we multiply the concentration of hydrogen (microliters per liter) times the volume of dry gas collected we get total microliters of hydrogen in each 15 minute collection at ambient pressure and temperature. We convert microliters to micromoles using the Ideal Gas Law (PV = nRT) so that the data is pressure and temperature independent.

To determine the total amount of hydrogen exhaled and belched in the 120 minutes (or any other desired time period) after the magnesium is ingested the amounts from each 15 minute collection are simply added together. This represents the amount of hydrogen derived from the reaction of the magnesium plus the amount of hydrogen normally present in exhaled air due to the metabolic activity of gut bacteria. In order to correct for the presence of the bacteria-derived hydrogen we collect exhaled air

before the magnesium is ingested. When a person fasts overnight his rate of excretion in exhaled air is quite stable. Thus if we collect exhaled air before the magnesium is ingested, it is safe to assume that the rate of excretion during these collections is constant for the next few hours.

We make this correction by making three collections of exhaled air before the magnesium is taken. The amount of hydrogen in these collections is divided by the time of each collection in minutes to determine the (pre-magnesium) rate of hydrogen excretion in micromoles per minute. The mean and standard deviation of these three measurements is calculated; this value is called the "baseline hydrogen excretion rate", or just the "baseline". We assume that the breath hydrogen excretion rate will not exceed the baseline unless magnesium is ingested (or a meal is eaten).

After ingesting magnesium the hydrogen excretion rate of subjects who have received betazole does not usually increase above the baseline for twenty or thirty minutes. Thus when we calculate the amount of hydrogen in exhaled air due to the ingestion of magnesium we: (1) exclude all data from collections in which the hydrogen excretion rate does not exceed the baseline; (2) sum the micromoles of hydrogen in all the remaining collections (N); (3) sum the duration of all the remaining collections (T, this is the time interval in minutes, during which the hydrogen excretion rate exceeded the baseline); (4) multiply the baseline times T; (5) subtract this value from N. The result is called the "total excess hydrogen" for the 120

minutes (or whatever time period is selected) after the magnesium was ingested:

$$\text{Total Excess } H_2 = N - (\text{baseline})\ (T).$$

This value has proven to be the most useful way to express the results of the proposed breath hydrogen/oral magnesium test for gastric acid.

Electrocardiogram for monitoring: This will be done to exclude any possible effect of magnesium or the heart.

Screening for occult blood: Hemoccult^{R} cards (Smoth Kline Diagnostics, Sunnyvale, California) will be used by subjects to provide stool samples from the bowel movement just before and the two just after each experiment. The cards will be examined for the presence of occult blood according to the instructions provided by the manufacturer.

Symptoms questionnaire: During each experiment subjects will be asked if they were experiencing any discomfort, such as abdominal cramps, heartburn, gas pains, and the like. They were also asked to report if such symptoms, or diarrhoea, occurred during the 48 hours following each experiment.

Serum samples (Revised): A venous blood sample will be drawn from each subject an hour or two before the dose of magnesium was given. Samples will be also drawn from each subject between 24 and 72 hours after each dose of magnesium. Serum will be frozen at -20°C on the same day that the blood was drawn. Serum calcium, magnesium, total bilirubin, creatinine, glutamic-oxaloacetic transaminase (SGOT), and alkaline phosphatase levels will be determined by the Clinical Chemistry Laboratory.

Small amount of Metallic Magnesium (unreacted in the stomach) is insoluble in Fat and water in the intestine and is not absorbed into the blood circulation. Therefore we do not expect any systemic effect of magnesium on the liver and kidney functions. However to rule out the possibility of any unexpected effect on these organs, routine biochemical screening will be done before and after magnesium administration. Since these tests were also done in the US Volunteers, we will be able to compare if there is any realtionship.

Standard Intubation Gastric Analysis:

Intubation: Nasogastric intubation will be done in subjects for collecting basal and stimulated gastric acid sample. After one hour of basal collection (every 15 minutes), Histalog will be injected to stimulate acid production and further collection will be made for another 2½ hours. The total procedure will take about 3½ hours.

Titration of acidity: Free acid and total acid in the gastric juice will be determined by titration against O.OlN NaOH solution to pH 3.5 (Free acid) and 7.0 (total acid) with a glass electrode (pH Meter). Acidity will be expressed as mole of hydrochloric acid per hour.

Data Analysis:

Data will be recorded on prescribed forms and analysis will be carried out using ICDDR,B Computer facilities.

(a) Regression and correlation analysis will be performed to determine the interrelationship between the gastric acid production as measured by the tandard test and hydrogen gas liberation during the magnesium breath H_2 test.

(b) Hydrogen gas concentration in exhaled air will be compared before and after betazole stimulation.

(c) Serum chemistry values will be compared before and after magnesium administration.

SIGNIFICANCE: See Rationale.

FACILITIES REQUIRED:

Office space: Present facilities will be utilized.

Lab. space: Existing facilities will be utilized.

Hospital source: None

Animal resources: None

Logistic support: None

Major Equipment: Quintron Microlyzer, Dry Test Meter (US $ 4000.00).

We plan to purchase a Quintron Microlyzer - a gas chromatograph specifically for measuring concentrations of H_2 in air. This machine uses room air as a carrier gas, is capable of measuring 1 sample every 2 minutes, and has a digital readout with ppm. H_2. In contrast the old gas chromatograph in ICDDR,B uses Argon as a carrier gas (this must be imported)- can measure about 8 samples per day and the ppm must be

calculated from graphic plot. This new Microlyzer should therefore be useful for many follow-up studies.

The dry test meter will be used to measure total volumes of expired air. This is a very robust piece of equipment and will be suited for field as well as hospital studies.

Others: None

Transport: None

COLLABORATING ARRANGEMENTS:

This study will be done in collaboration with Drs. David Sack and C. Stephensen, Johns Hopkins Hospital, Baltimore, Maryland, USA.

SYMPTOM QUESTIONNAIRE

Name of subject: _____ Hospital No.: _____

Date: _____ Age: _____ Sex: _____

Time magnesium given: _____

Did you have during following period any symptom such as:

	0-24 hrs	24-48 hrs
(a) Nausea		
(b) Vomiting		
(c) Abdominal pain		
(d) Abdominal cramps		
(e) Abnormal stool		

If positive for symptoms, please describe:

(a) Duration of symptoms: _____

(b) Assessment of severity: _____

(c) Degree of incapacitation: _____

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10. Samloff IM, Secrist DM, Passaro E. A study of the relationship between serum group I pepsinogen levels and gastric acid secretion. Gastroenterology, 69, 1196-1200, 1975.

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SECTION III - BUDGET

(Revised)

Persons	Position	% effort	Annual salary	Project requirement Dollar	Taka
Dr. G.H. Rabbani	Principal Investigator	40%	72,000	12000	30,000
Dr. F. Van Loon	Co-Investigator	15%	-	-	-
Dr. David Sack	Co-Investigator	5%	-	-	-
Dr. C.B. Stephensen (Baltimore)					
				US $ 1200	Tk. 30,000

Supplies and equipments:

Quintron chromatograph and supplies	US $ 3500
Betazole injection (histalog)	250
Magnesium (Alfa Products, USA)	10
Barometer	200
Dry Test Meter	1000
Calibrating syringe	500
Hemoccult cards (USA) (Donated by JHU)	100
One hand calculator	50
Table clock	150
Y-valves	400
Breathing masks (3)	300
Gas collection bags (20)	400
Tubing and couplings	100
Gas syringes, gelatin capsules, miscellaneous supplies	200
Sut Total	US $ 7,160.00

SECTION III - BUDGET
(Continued)

Biochemistry Budget: (For 20 subjects)

Total and Free Gastric Acid = 20 tests X @ $ 1.50 = 360.00

Serum chemistry:

Bilirubin	= 40 tests X @ $ 2.57	= 103.00
Calcium	= 40 tests X @ $ 2.74	= 110.00
Magnesium	= 40 tests X @ $ 2.74	= 110.00
Creatinine	= 40 tests X @ $ 2.33	= 94.00
SGOT	= 40 tests X @ $ 2.50	= 100.00
SGPT	= 40 tests X @ $ 2.50	= 100.00

Sub total: US $ = 977.00

Patients' hospitalization: Nil

Out patient care : None

Travel of persons: Round trip fare from Baltimore-Dhaka for Dr. Stephensen (including local per diem) = $ 2,500.00

Transportation of thing: None

Rent, Communication and Utilities: None

Printing and Reporduction: US $ = 100.00

Contractual services: None

Computer time: US $ = 400.00

BUDGET SUMMARY

		Taka	Dollar
1.	Personnel services	30,000	1,200
2.	Supplies and equipment	203,425	8,137
3.	Patients' hospitalization	-	-
4.	Out patient care	-	-
5.	Transport	-	-
6.	Travel of persons	62,500	2,500
7.	Transport of things	-	-
8.	Rent (communications)	-	-
9.	Printing/Reporduction	2,500	100
10.	Contractual services	-	-
11.	Computer time	10,000	400
	Tk.	308,425	US $ 12,337

ABSTRACT SUMMARY

Validation of a magnesium-breath hydrogen test for measuring gastric acid production in adult Bangladeshi volunteers

1. This test will be conducted in 20 adult (male or female) healthy, Bangladeshi volunteers to further validate the results of previous animal and human volunteer studies. Magnesium metal (150 mg) will be given orally and expired air will be collected to measure the concentration of hydrogen gas. Patients will also have nasogastric intubation to collect stomach acid for a 2 hour period. Blood sample (5 c.c.) will be collected to check liver and kidney functions.

2. We do not expect any risk from the use of magnesium metal in these subjects, based on the pharmacologic and toxicologic evidences and the results of animal and human volunteer studies in US.

3. The US Food and Drug Administration (FDA) and the Joint Committee on clinical investigation of the Johns Hopkins University School of Medicine have given approval for use of magnesium in man.

4. The study involves no risk as to the psychological, social, legal or other aspects of the subjects.

5. Data will be computerized and confidentiality will be maintained. All data will be abbreviated and will be published without reference to the subjects name and identity.

6. Informed written consent will be obtained from the subjects before enrolling into the study. No personal interview except relevant history of stomach disease will be taken

7. The direct benefit to the subject is that they will know about their acid secreting ability of the stomach, if achlorhydria is present they should be alerted to avoid possible exposure to enteric infection.

8. No retrospective hospital records will be used.

Consent Form

Evaluation of an oral magnesium breath hydrogen test for quantitation of gastric acidity in man

(Explanation of the project to the subject)

You are being requested to volunteer for a research study designed to evaluate the clinical usefulness of a new test to measure the amount of acid in you stomach. If successful this procedure should make testing of gastric acidity much simpler than the current test. We are looking for healthy/subjects of either sex between 18 and 60 years of age who have no prior history of stomach ulcers or stomach surgery.

If you accept the study, you will be in the hospital for 3 hours in two occussions. One breath hydrogen test will be performed in the morning. We will draw a blood sample (5 c.c.), will collect samples of your breath, will give you by injection small amount of Histalog (this medicine stimulates your stomach to produce acid) and will give you a small amount of magnesium to drink. We will also aks you some questions about any symptoms you might experience for the test procedures.

You will have to swallow a small rubber tube in the morning for collection of your stomach juice for 2 hours. During the test you will not eat anything and collection will be made every 15 minutes. This is standard test for gastric acidity and will not harm you in any way.

We do not expect any harmful effects from the test. The Histalog may cause transient flushing, headache and salivation. We do not expect side-effects from magnesium since one recommended daily requirement for magnesium for adult is 350 mg which is less than our dose in the study (150 mg).

If you enter the study you will know if you have low acid producing capacity of the stomach which will be helpful to avoid further infection. However, we hope that the development of this simple test for gastric acid will help other people who have abnormalities of stomach acid. You are free to withdraw from the research at any time. If you do not join the study or if you decide to withdraw, the same quality of medical care will still be available to you at the ICDDR,B.

Please indicate by your signature below that the research procedures described above have been explained to you and that any questions that you have asked have been answered to your satisfaction.

If you agree to join the study, please sifnify your consent by signing below.

Signature of Investigator _____ Subjects signature _____

Date: _____ Hospital No.: _____

আন্তর্জাতিক উদরাময় গবেষণা কেন্দ্র,
ঢাকা, বাংলাদেশ

(পাকস্থলীর পাচক রস গবেষণা)

এই গবেষণার দ্বারা পাকস্থলীর পাচক রস নিঃসরণের ক্ষমতা পরিমাপ করার জন্য একটি নতুন পদ্ধতির পরীক্ষা করা হইবে। এই নতুন উদ্ভাবিত পদ্ধতি কার্যকর প্রমানিত হইলে পাচক রস নির্ণয় করা খুব সহজ সাধ্য হইবে। এই পদ্ধতিতে শুধু নাক হইতে নির্গত শ্বাস সংগ্রহ করিলেই হয়, পেটে নল প্রবেশ করাইবার প্রয়োজন হয় না। যে কোন সুস্থ্য ব্যক্তি যাহাদের বয়স ১৮ হইতে ৬০ বছরের মধ্যে তাহারা এই গবেষণায় অংশ গ্রহণ করিতে পারিবেন। এই পরীক্ষায় একটি ছোট রবারের বেলুনে নাক হইতে নিশ্বাস গ্রহণ করা হইবে (৯০ মিনিট পর্যন্ত), ১৫০ মিলিগ্রাম ম্যাগনেসিয়াম (150 mg Magnesium) সেবন করিতে হইবে ও একটি ইনজেকশন(Inj.Histalog)দেওয়া হইবে। এই ইনজেকশন পাচক রসের উৎপাদন বৃদ্ধি করে। এতে করে সামান্য লালা নিঃসরণ, মাথা ব্যথা ও চোখে মুখে গরম ভাবের সৃষ্টি হতে পারে তবে কোন প্রকার ঝুঁকির সম্ভাবনা নাই। ম্যাগনেসিয়াম দ্বারা কোন পার্শ্ব প্রতিক্রিয়ার সম্ভাবনা নাই, কারণ একজন সুস্থ্য ব্যক্তির জন্য দৈনিক যে পরিমান ম্যাগনেসিয়াম দরকার (৩৫০ মিলিগ্রাম) তার চাইতে অনেক কম পরিমানে (১৫০ মিলিগ্রাম) ইহা দেয়া হইবে।

এই গবেষণায় অংশগ্রহণ দ্বারা আপনি আপনার পাকস্থলীর পাচক রস নিঃসরণের ক্ষমতা সম্পর্কে জানিতে পারিবেন। যদি পাচক রসের পরিমান কমিয়া গিয়া থাকে তবে নানা প্রকার উদরাময় রোগের ঝুঁকি থাকে। ইহার দ্বারা আপনি ভবিষ্যতের জন্য প্রতিশেধক ব্যবস্থা গ্রহণ করিতে পারিবেন। ইহা ছাড়া এই গবেষণা লব্ধ জ্ঞান দ্বারা জনসাধারণের পাকস্থলীর পীড়া নির্ণয়ের ব্যাপারে যথেষ্ট পরিমান সাহায্য হইবে। গবেষণা হইতে যে কোন সময় আপনি নিজেকে সরিয়ে নিতে পারিবেন। গবেষণার জন্য আপনার সকল তথ্যাদি গোপন রাখা হইবে।

নীচে আপনার দস্তখতের দ্বারা বুঝিয়ে দিন যে গবেষণা সংক্রান্ত সকল বিষয় আপনাকে পরিস্কার ভাবে জানান হইয়াছে এবং আপনার কোন প্রশ্ন থাকিলে তাহারও সন্তোষজনক উত্তর দেওয়া হইয়াছে।

যদি আপনি গবেষণায় অংশ গ্রহণ করিতে সম্মত থাকেন তবে নীচে দস্তখত করুন।

গবেষকের স্বাক্ষর

গবেষণায় অংশগ্রহণকারীর স্বাক্ষর

তারিখ----------