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# Medical Aspects of the Holy Eucharist: A Physiological and Canonical Study

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IN NO OTHER Sacrament is Divinity so intimately perfused in material substance as in the Holy Eucharist, and in no other Sacrament is the union of the recipient with his Creator physical as well as spiritual. The physical and especially the physiological aspects of this Sacrament render it of unique importance to the physician. The object of this paper is briefly to summarize medically pertinent canonical regulations related to the Sacrament and to examine experimental data concerning time-relationships of the human digestive process.

The practical aspect of the reception of Holy Eucharist by a patient often presents multiple facets to the physician. The patient may require an indwelling Levin tube with constant Wangensteen-type suction. Vomiting may be intractable. Death may be imminent. Severe diarrhea may supervene in a patient with an ileostomy. In addition, the performance of an autopsy upon a person who has recently received Viaticum poses further related questions. In general, theological opinion holds that the Divine Presence remains as long as the physical form of the host is incorrupt "according to common estimation." The crux of

the problems suggested above lies in the time required for physiological alteration ("corruption") of the host by the human digestive system.

Generally speaking, alteration or "corruption" of the ingested wafer (starch) is dependent upon both mechanical and chemical factors. Deglutition and gastric peristalsis contribute to the physical disruption of the host. Chemical or enzymatic degradation proceeds *pari passu* due to the action of the salivary enzyme, ptyalin. Salivary digestion is influenced by (a) the amount of ptyalin in the saliva, (b) the thoroughness of mechanical mixture of ptyalin and substrate, and (c) the time during which the enzyme is allowed to act.<sup>1</sup> Since the optimal pH for ptyalin activity is in the range 6.6 - 6.8, it is evident that high gastric acidity may effectively neutralize its amylolytic action.

In an effort to estimate the approximate time required for corruption of the host under varying conditions, a series of fifty *in vitro* experiments was conducted.

<sup>1</sup> Bard, P. (ed.): *Macleod's Physiology in Modern Medicine*, 9th ed., St. Louis, The C. V. Mosby Company, 1941. p. 964.

TABLE I.  
RELATIONSHIP OF pH TO DISSOLUTION TIMES.

Age	Diagnosis	pH	Free Acid	Agitation	Beginning dissolution	TIME Wafer Unrecognizable but not completely dissolved	Complete dissolution
40	duodenal ulcer	7.3	no	10"	15"	30"	1'30"
63	gastric ulcer	1.8	yes	1'	5'30"	6'	7'
53	post-op. subtotal gastrectomy	7.1	no	30"	3'	3'30"	4'
26	post-op. subtotal gastrectomy	7.1	no	none	10"	30"	1'30"
56	post-op. subtotal gastrectomy	5.2	no	none	10"	1'30"	2'
31	post-op. subtotal gastrectomy	5.5	no	none	30"	2'	3'
40	post-op. subtotal gastrectomy	7.0	no	none	10"	30"	1'
64	post-op. subtotal gastrectomy	6.9	no	30"	30"	1'30"	2'
65	post-op. subtotal gastrectomy	6.9	no	30"	30"	2'	2'30"
32	hiatus hernia	1.9	yes	30"	10'	11'	14'
58	bleeding duodenal ulcer	1.7	yes	none	10'	18'	20'
62	post-op. subtotal gastrectomy	5.3	no	none	2'	8'	10'
57	hiatus hernia	1.5	yes	30"	2'	17'	20'
35	post-op. subtotal gastrectomy	3.3	yes	30"	2'	6'	8'
57	post-op. subtotal gastrectomy	7.7	no	30"	2'	8'	10'
64	hiatus hernia	7.4	no	30"	2'	10'	14'
60	hiatus hernia	1.5	yes	30"	18'	21'	..
62	duodenal ulcer	2.75	yes	30"	3'	3'30"	4'
55	hiatus hernia	2.5	yes	30"	13'	15'	..
58	hiatus hernia	6.8	no	none	1'	1'30"	2'
67	gastric ulcer	2.4	yes	30"	2'30"	4'	6'

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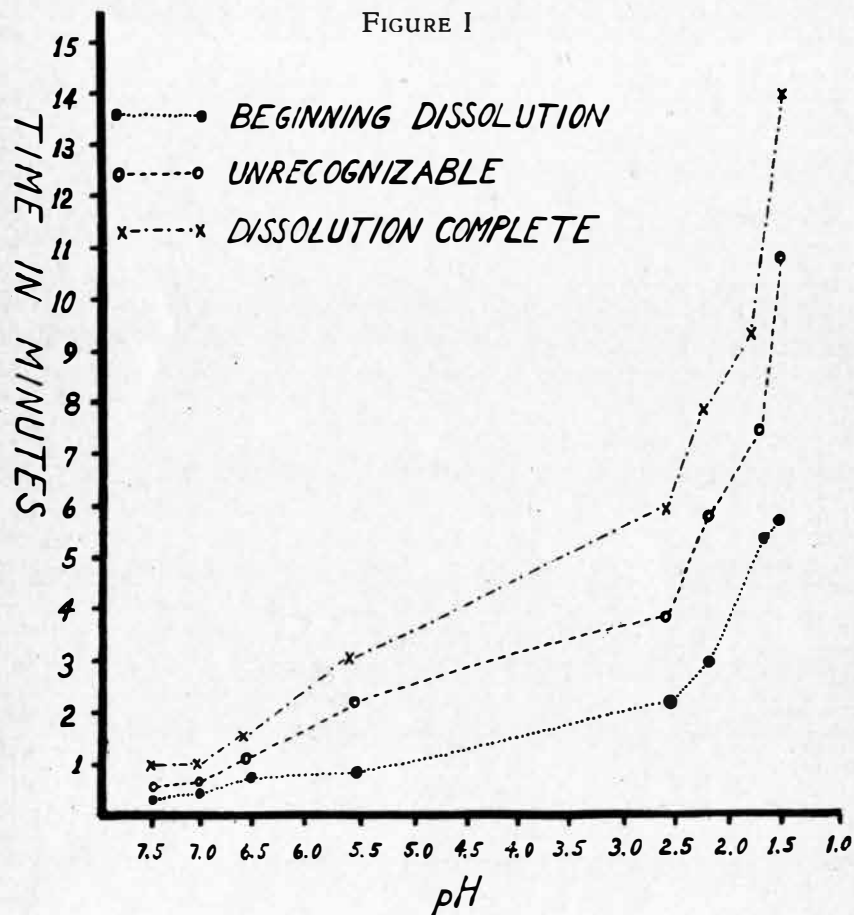
FEBRUARY, 1955

61	obstructed duodenal ulcer	2.4	yes	30"	3'	4'30"	..
59	post-op. subtotal gastrectomy	6.7	no	none	15"	30"	1'
58	post-op. subtotal gastrectomy	7.0	no	none	15"	30"	1'30"
36	post-op. subtotal gastrectomy	5.0	no	none	15"	30"	2'
42	post-op. subtotal gastrectomy	6.6	no	none	15"	30"	..
44	post-op. subtotal gastrectomy	2.1	yes	30"	4'	5'	..
34	duodenal ulcer	1.9	yes	30"	5'	12'	..
57	duodenal ulcer	1.5	yes	30"	6'	13'30"	..
42	duodenal ulcer	1.3	yes	30"	2'	5'	..
40	duodenal ulcer	2.3	yes	30"	3'	6'	9'
60	gastric ulcer	2.3	yes	10"	2'	3'	4'
56	hiatus hernia	6.8	no	10"	2'	3'	4'
55	post-op. subtotal gastrectomy	7.5	no	10"	2'	3'	3'30"
81	chron. cholecystitis: gastr. ulcer	7.2	no	none	2'30"	3'	2'30"
28	duodenal ulcer	7.7	no	none	30"	1'30"	..
59	duodenal ulcer	1.8	yes	30"	7'	30'	..
44	bleeding duodenal ulcer	1.6	yes	30"	5'	7'	9'30"
57	hiatus hernia	1.5	yes	30"	6'	11'	14'
47	post-op. subtotal gastrectomy	3.4	yes	none	1'	2'	3'
34	post-op. hiatus herniorrhaphy	7.5	no	none	15"	30"	1'
64	duodenal ulcer	7.3	no	none	10"	20"	30"
56	gastric ulcer	6.5	no	none	30"	1'	1'30"
42	duodenal ulcer	2.7	yes	none	30"	1'30"	2'
38	pre-pyloric ulcer	2.4	yes	none	1'30"	2'	2'30"
33	post-op. subtotal gastrectomy	1.6	yes	none	1'30"	2'	3'
67	post-op. subtotal gastrectomy	2.4	yes	30"	30"	2'	2'
61	duodenal ulcer	6.8	no	15"	30"	1'	1'30"
37	post-op. subtotal gastrectomy	6.8	no	15"	30"	1'	1'30"
38	post-op. subtotal gastrectomy	1.5	yes	45"	8'	11'	..
		3.3	yes	30"	2'30"	4'	5'
		7.5	no	10"	30"	1'	2'

**Method:** With the patient in the fasting state the stomach was aspirated by means of a Levin tube. The pH of the recovered specimen was determined with a Beckman electrometric pH-meter. A 5 cc. sample was placed in a water-bath at 37°C. One-quarter of a standard-sized (2.8 cm. diameter) unconsecrated host was mixed with saliva intra-orally and then placed in the sample of gastric juice. Agitation with a wooden spatula for varying periods was occasionally used to simulate the mechanical effect of peristalsis. Three end-

points were determined: (a) the time required for beginning dissolution to become apparent; (b) the time required for the host to become unrecognizable as such, but not completely dissolved, and (c) the time required for complete dissolution. These end-points were dependent upon the judgment of the observer ("according to common estimation"), in the absence of a feasible chemical test. All the subjects were male and the age range was from 26 to 81 years. Table I summarizes the results obtained in this study.

FIGURE I



It is evident that rapidity of dissolution varies inversely with the acidity of the specimen, due principally to the inhibition of ptyalin in an acid medium. Several representative determinations illustrating this relationship are presented graphically in Figure I.

Regardless of the pH, in only 9 of the 50 patients did the time required for the wafer to become unrecognizable ("corrupt"), though not completely dissolved, exceed 10 minutes, and in the majority it was considerably less. In these 9 individuals, all of whom showed a low pH, the times ranged from 11 minutes to 21 minutes. It is likely that all of the recorded times would have been shorter if *in vivo* peristalsis could have been more effectively simulated.

#### CANON LAW AND THEOLOGICAL OPINION

The Code of Canon Law<sup>2</sup> commands that Holy Viaticum for the sick be not unduly postponed, and those who have the care of souls are enjoined to watch with care so that patients may be refreshed with Viaticum while fully in command of their faculties. In many fatal illnesses the hours previous to the moment of death are not conscious ones. Some patients may be irrational or comatose. Others, while conscious, may experience difficulty in swallowing in the hours preceding death because of vomiting or the necessity of employing nasogastric suction.\* Thus in such

cases there is little possibility of Viaticum being administered in the final minutes of life with death ensuing immediately after swallowing of the Sacred Host. However, there are some types of death which could conceivably occur immediately after the reception of Communion. The incident of a man suffering a fatal coronary occlusion or cerebral vascular accident in or near church after receiving Communion, the execution of a condemned criminal soon after his last Communion, or the sudden death of an accident victim are possible instances in which Communion may have been received within a very short time before death. Should an autopsy be performed promptly there arises the problem that the Sacred Host may not have been digested and may still be incorrupt in the stomach. Digestion is known to continue post mortem since the digestive enzymes already secreted at the time of somatic death retain their potency. The chemical interaction of the enzymes and stomach content does not cease immediately although the declining environmental temperature tends to retard the rate of digestion. The potency of enzymes already secreted at the time of death is readily manifest by autolysis. Most autopsies are performed several hours after death, which would appear to allow sufficient time for the corruption of the Host in the cadaver by the action of the enzymes present.

<sup>2</sup> Codex Juris Canonici, canon 865, Newman, Westminster, Maryland, 1942. p. 290.

<sup>3</sup> Malboeuf, Rev. Rene P.: personal communication.

\* It has been observed<sup>3</sup> that patients with indwelling Levin tubes on constant suction may swallow the Species more readily if the tube is compressed with the fingers during the act of deglutition.

However, it is frequently advisable that necropsy be performed promptly on patients dying of certain diseases, such as brain tumor and blood dyscrasias, especially the leukemias, in order that the histopathology be altered as little as possible by post mortem degeneration. If such an autopsy is performed shortly after death (as may also be done in the case of an executed criminal), there exists the possibility that the Sacred Host is still incorrupt. If the doctor performing the post mortem examination must examine the stomach and finds the Host still recognizable it would seem proper that he take hold of It with forceps, place It in a clean cloth, and request a priest to take It for disposition. In this event the priest would be guided by the prescriptions of the Roman Missal<sup>4</sup> which require that the Host be placed in a holy place until It corrupts. What remains is then to be put into the sacarium. If the post mortem procedure does not necessitate opening the stomach enzymatic action will dispose of the Host in due time. The time required for digestion and corruption of the Sacred Species is not uniformly estimated by all theologians. (The manuals do not treat of post mortem digestion but merely discuss the length of time that the Species remains incorrupt in the stomach of the communicant.) Merkelbach<sup>5</sup> observes that the common estimate is fifteen minutes although some writers require thir-

<sup>4</sup> Missale Romanum, Tit. 10, De Defectibus, n. 14., Mame, Turin, 1951, p. 50.

<sup>5</sup> Merkelbach: *Summa Theologiae Moralis*, 2nd ed., (3 vols.), Desclée, Paris, 1936. Vol. III, p. 212.

ty minutes. This estimate is made of the healthy, for in the sick he says the Species remains several hours or even a day. Canon Durieux<sup>6</sup> states, "A sick stomach sometimes takes two or three hours to digest a small Host." Capellmann<sup>7</sup> thinks a space of a half-hour to be the minimum needed. Cappello<sup>8</sup> cites Gasparri<sup>9</sup> who quotes the opinion of two physicians<sup>10</sup> that a minimum of one-half hour is required for the digestion of a small Host except in the case of the sick. They state that, "Other than the few ulcerous stomachs which may digest a small Host in ten or twenty minutes an afflicted stomach will need two or three hours to act on the small Host."

#### DISCUSSION

As far as could be determined, the most recent medical estimate regarding the minimum time required for corruption of the ingested Host has been that of George and Core<sup>10</sup> in 1893. These writers agreed on a minimum of one half hour for the digestion or corruption of a small Host by a healthy stomach. They state that "the few ulcerous stomachs" may digest a small Host in 10 or 20 minutes. It is evident that the "ulcerous stomachs" mentioned by

<sup>6</sup> Durieux: *The Eucharist* (Law and Practice), translated by Dolphin, Donnelly, Chicago, 1926, p. 184.

<sup>7</sup> Capellmann: *Medicina Pastoralis*, 7th ed., Barth, Aachen, 1890, p. 187.

<sup>8</sup> Cappello: *De Sacramentis*, (5 vols.), Marietti, Turin and Rome, 1949-1953. Vol. I, p. 327.

<sup>9</sup> Gasparri: *De Eucharistia*, (2 vols.), Delhome and Briquet, Paris, 1897. Vol. II, pp. 407-408.

<sup>10</sup> George and Core: *L'Universite Catholique*, December, 1893.

the writers must refer to the achlorhydric stomachs of malignant gastric ulcer and not the highly acid stomachs of benign duodenal ulcer.

Since nowhere was encountered an estimate of wafer-digestion based on experimental evidence, the present study was undertaken. The results indicate that corruption of the ingested host may progress at a considerably more rapid rate than heretofore believed, and that, *ceteris paribus*, the pH of the gastric contents is a decisive factor. In general, the speed of dissolution varies inversely with the pH of the gastric secretions. Even in the few subjects whose time of digestion was prolonged, the maximum time for the ingested host to become unrecognizable did not exceed 21 minutes. It would appear, therefore, that the previously accepted values should be revised downward. On a practical plane, it would seem that except in the most unusual circumstances no undue concern about possible desecration of the Sacred Species need be entertained when an autopsy is conducted on a recent communicant. Intractable vomiting would, of course, militate against reception of the Sacrament. However, even a patient requiring nasogastric suction may receive Communion, particularly if there is no medical contraindication to the interruption of suction for a period of 20 to 30 minutes after reception of

the Host. The use of a Miller-Abbott tube on constant suction should constitute no deterrent to the reception of the Sacrament if the advancing end of the tube is in or beyond the duodenum. It is almost a certainty that a Host received by an ileostomy patient with severe diarrhea would be corrupted long before It reached the terminal ileum. Apart from mental incompetence, defective sensorium, or intractable vomiting, there appear to be few medical contraindications to the reception of Holy Communion by the ill. In general, it would seem that the Grace to be gained by reception of the Sacrament outweighs any risk of irreverence to the Sacred Species if such irreverence is less than *certain* to follow.

#### CONCLUSIONS

Experimental data herein presented indicate that the time required for corruption of the ingested host is briefer than previously believed. The rapidity of digestion varies inversely with the pH. Apart from mental incompetence, defective sensorium, or intractable vomiting, there appear to be few medical contraindications to the reception of Holy Communion by the ill. In debatable instances it would seem that the Grace to be gained by reception of the Holy Eucharist outweighs any risk of irreverence if the latter is less than *certain* to follow.