

Air Controllers Syndrome

*Peptic Ulcer In Air
Traffic Controllers*

BY RICHARD R. GRAYSON, M.D./ST. CHARLES

Reprinted from Illinois Medical Journal, August, 1972



Air Controllers Syndrome

Peptic Ulcer In Air Traffic Controllers

BY RICHARD R. GRAYSON, M.D./ST. CHARLES

During a serious labor-management dispute between the Federal Aviation Administration and its employees, the air traffic controllers, in March, 1970, many of the controllers simultaneously ceased their work in a "sick-out" and reported to private physicians for evaluation of chronic stress-related symptomatology. I examined and treated 111 air traffic controllers during a one-year period beginning with the onset of the "sick-out."

Eighty-six of these men exhibited signs and symptoms of peptic ulcer sufficiently severe that they were referred to local hospital radiologists for upper gastrointestinal evaluations by means of barium meal examination. Sixty-six of these examinations were reported as pathological. Thirty-six men had X-ray evidence of peptic ulcer.

Results

Of the group of 111 controllers, 86 men were given the standard upper gastrointestinal X-ray studies. Nine categories of radiological findings were identified. These categories and the criteria are (See Table 1):

1. *Duodenal ulcer with crater:* There were 18 cases in which a crater, a niche, or an ulceration of the duodenal bulb or of the post-bulbar duod-

enum were reported, with or without signs of duodenitis.

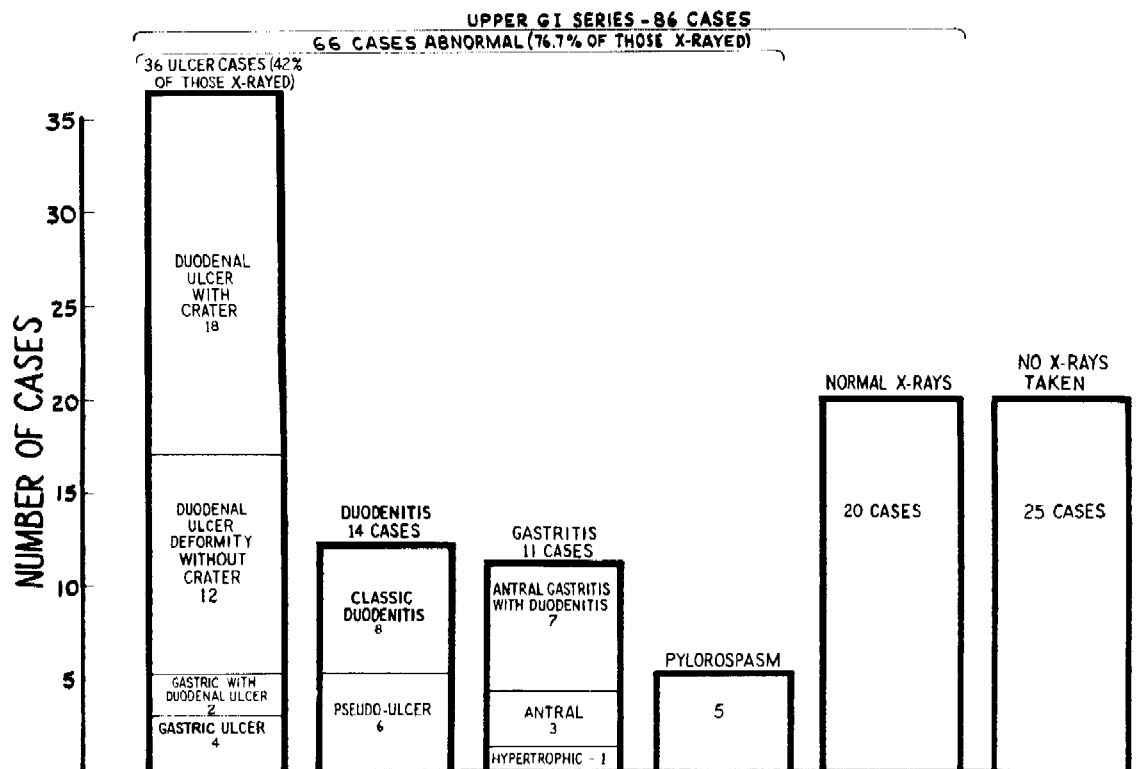
2. *Duodenal ulcer deformity without crater:* Twelve were found in which there was a persistent deformity or irregularity, slight or marked, of the duodenal bulb, with or without signs of duodenitis, or of the post-bulbar duodenum.

3. *Duodenitis:* a) Eight cases of typical duodenitis and b) Six cases of atypical duodenitis ("pseudo-ulcer") were found. These 14 cases are listed together under the heading of duodenitis. Radiographically, typical (classic) duodenitis was considered present when prominent or coarsened mucosal folds in the duodenal bulb were demonstrable and were associated with bulbar spasm and/or irritability.

Six cases in which bulbar spasm, irritability, and usually pylorospasm were seen radiographically, but in which there was no mucosal ab-

Table I

GASTRO-DUODENAL DISEASE IN 111 AIR TRAFFIC CONTROLLERS



normality detected were classed as atypical duodenitis. Such patients, who complain of epigastric distress simulating the classic features of peptic ulcer, are commonly labeled "pseudo-ulcer." Causes of the pseudo-ulcer syndrome include: a) Non-visualized superficial ulcer and b) Duodenitis.

A clinical, radiological, and statistical study¹ showed that peptic ulcer developed in about 40% of cases originally diagnosed pseudo-ulcer, but that "reasons exist for not regarding pseudo-ulcer a true precursor of peptic ulcer."

4. *Gastric ulcer with crater*: Four cases included:

- a. Ulcer in the pyloric canal (channel ulcer),
- b. Prepyloric ulcer,
- c. Distal antral ulcer.

5. *Gastric ulcer and duodenal ulcer combined*: Two cases were found of double ulcers, increasing the total of ulcers in the series to 38 while the number of men with ulcers was 36. There was thus a cumulative total of 32 duodenal ulcers and six gastric ulcers.

6. *Hypertrophic gastritis, chronic*: One case was found. Enlarged rugae were present radiographically throughout the stomach without evidence of ulceration.

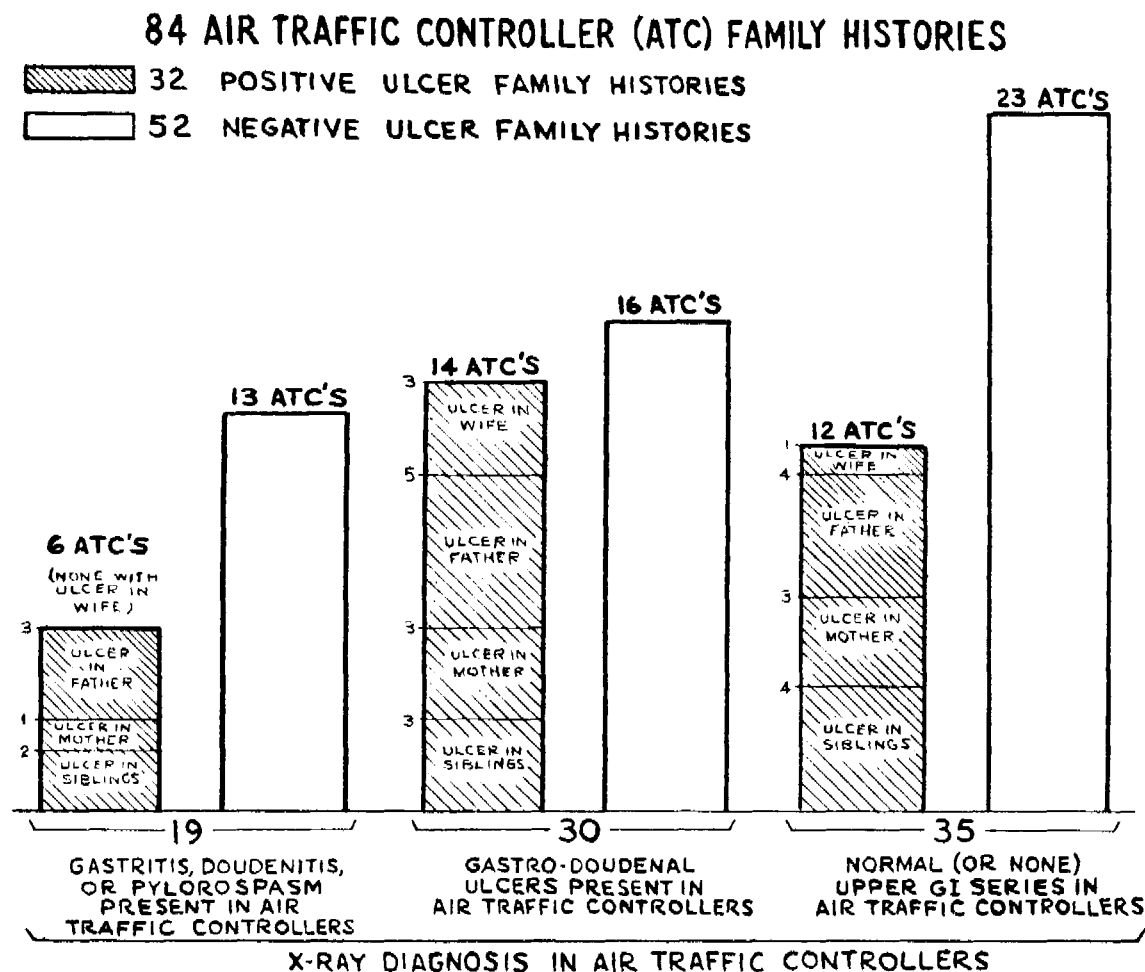
7. *Antral gastritis*: 10 cases. Seven of these patients also demonstrated duodenitis and are different patients from those listed under the heading of duodenitis. Three patients had antral gastritis by X-ray without any other demonstrable gastroduodenal pathology. Originally one other case of antral gastritis was diagnosed, but this patient later developed a demonstrable duodenal ulcer and is included under that heading. Antral gastritis in this series is defined as any combination of the following radiographic signs:

- a. Persistent deformity or rigidity of the antrum.
- b. Irregularity, coarsening, or prominence of

RICHARD R. GRAYSON, M.D., is in the private practice of internal medicine in St. Charles. A graduate of the University of Illinois College of Medicine, he is on staff at Delnor Hospital, St. Charles, and Community Hospital, Geneva. Dr. Grayson is a member of the Academy of Air Traffic Control Medicine, which he serves as president. He has done research in the field of stress disease and has published on this topic.



Table II



the antral or prepyloric mucosal pattern.

c. Protrusion of the antral mucosa into the duodenal bulbar base. (This sign was found in combination with others in all cases and therefore was not considered a sign of gastritis alone.)

d. Irritability and spasm of the antrum, prepylorus, and/or pylorus,

8. *Pylorospasm*: Six cases exhibited delayed gastric emptying in the presence of normal or increased gastric peristalsis. No other pathology was discovered. In one of these a follow-up radiologic examination two months later revealed a duodenal ulcer crater. The final total for the series, therefore, is five cases of pylorospasm.

9. *Normal upper G.I. series*: No abnormalities of contour or function were reported in 20 of the 86 cases examined radiographically.

Family History

In the present series of 111 air traffic controllers, there was family information concerning ulcer incidence in 84 (Table II). Of 30 air traffic controllers with proven gastroduodenal ulcers,

14 had positive ulcer family histories, whereas, of 35 controllers with no ulcers, 12 had positive family histories.

Appraisal of the family history data raises interesting questions for a larger, statistically significant study of air traffic controllers; there were 84 men whose family history was known and, of these, there were 12 men whose fathers had ulcers by history. Eight of the twelve ulcer-prone fathers were from the 49 ulcer-prone controllers. However, there were only four ulcer-prone fathers among the 35 controllers who had normal upper G.I. X-rays.

There were four ulcer-prone mothers in the first group and three ulcer-prone mothers in the normal group, an even distribution.

The ulcer-prone siblings also were divided equally between the abnormal and the normal controllers; there were five ulcer-prone siblings among the 49 ulcer-prone controllers, and four ulcer-siblings among the 35 normal controllers.

Statistical analysis with such small groups of people probably is not useful. However, the finding of more fathers and wives with a history

of ulcer among the ulcer-prone controllers than in their ulcer-free brethren is a coincidence that in itself may point to a relationship.

Smoking and Ulcers

Because positive correlation has been shown between the occurrence of peptic ulcers and smoking cigarettes² the responses of 70 controllers concerning smoking were analyzed. When non-smokers and smokers were compared to men categorized as to normal and abnormal upper gastrointestinal X-ray series, an interesting difference appeared which seems to implicate smoking as a positive factor in peptic ulcer occurrence.

Table III

	Normal		Total
	GI series	Abnormal	
Non-smokers (cigarettes)	15	20	35
Smokers	5	30	35
Total	20	50	70

Peptic Ulcer Incidence in Other Groups

The proven incidence of peptic ulcer in the present group of air traffic controllers is 32.5%. A search of extant medical publications has not revealed any other group with so high an incidence of peptic ulcer.

Physicians

As estimated by a mail questionnaire to which 8,052 (92%) of 8,716 eligible physicians responded, 11% of male Massachusetts physicians above the age of 45 reportedly have had a duodenal ulcer. The estimated annual incidence in males was between 2.5 and 4.0 per 1,000 in all age groups above the age of 25. About 1.5% of male physicians over 45 have had a gastric ulcer. These results did not indicate that peptic ulcer was unduly frequent among male physicians.³

Alcoholics

The prevalence of peptic ulcer was studied in 922 employees known to be problem drinkers in a large American company with a total employee population of 100,000. Of the drinkers, 20 or 3% were known to have gastric ulcer and 74 (8%) had duodenal ulcers. The history of ulcers was twice as great among drinkers as among a group of matched controls.⁴

Under Stress

A review of stress ulcers showed that the incidence of acute ulcers of the upper gastroin-

testinal tract in consecutive autopsies ranged from 1 to 6%.⁵

Coronary Patients

In a prospective study on coronary heart disease among 3,524 men aged 39 to 59 reported after two years of study, the incidence of peptic ulcer in the entire group was 9%. Among 70 cases of coronary heart disease discovered during this time, the incidence of peptic ulcer was 12.9%.⁶

Clerks

In a disability claim study of diseases during the period of 1963 to 1964 in Metropolitan Life Insurance Company clerical personnel, the annual incidence of gastroduodenal ulcer and gastritis among men aged 25 to 44 was 4.4 per 1,000 male personnel. The average disability per case in this same group was 28 days. There were 30,000 male employees in all, from which number there occurred 6,200 disability claims. Eighteen percent of the total claims were for digestive diseases. This was the leading cause of disability among the male employees.⁷

Airline Stewards

An analysis was made of the morbidity from peptic ulcer among airline stewards over a nine-year period. The mean annual population was 1,313 and the overall incidence was 2.6 per 1,000 per year. When corrected for age, the morbidity was very similar to that found among civilian airline pilots in a short-haul airline. The morbidity did not show any features which could be attributed to occupation or working conditions.⁸

Rural Workers

A three-year survey among 1,500 males in a semi-rural population revealed a prevalence rate for demonstrable peptic ulcer of 102 per thousand. A new rate expressing peptic ulcers per thousand dyspeptics (in this survey, 305 per 1,000) was described.⁹

Lawyers

A study of 2,342 questionnaires returned by Cleveland attorneys indicated an incidence of "stomach ulcer" ranging from 7.1% to 11.3%.¹⁰

Morbidity

According to the National Health Survey of the National Center for Health Statistics¹¹, peptic ulcer is one of the leading chronic conditions

causing disability. From 1963 through 1965 the average number of persons in the United States with some limitation of activity due to peptic ulcer was 550,000. Of these, 114,000 persons were unable to carry on a major activity due to peptic ulcer.

Discussion

If peptic ulcer is a disease caused by stress, as it appears to be, then the stress of the occupation of air traffic controller as it is presently constituted possibly is the cause of the unprecedented high incidence of peptic disease in the series here reported. When the manifold stresses in the lives of these men are considered, the nucleus of the stress constellation is the mid-air collision. All roads lead to Rome; every occupational stress found leads to the increased possibility of a mid-air collision. A narrowly averted mid-air collision caused by one of these conscientious, intelligent, punctilious young men has the same effect on him as if he himself had just escaped death by a hair's breadth. The "fight or flight" response that follows is useless because he is trapped at a radarscope, forced to continue issuing cool, concise commands into a microphone. The symptoms that follow, such as anxiety, anorexia, insomnia, and irritability, plus their spin-off effects of marital discord, interpersonal animosities, and efforts at peer-group support all then become stressors in their own right.

This constellation of stresses surrounding the central fact of the mid-air collision and the near-miss is the shadowy monster in the nightmare. When in the future the central problem is resolved, and the individual controller is no longer trapped alone in his daily drama, then the other stresses, and the ulcers, will return to more customary dimensions.

The medical issue of peptic ulcer in this series has economic, political, and sociologic ramifications. The present epidemic of peptic ulcer was at once both a symptom of a labor-management problem, and also a cause of an escalation of that problem. The stresses not only had reached a level which resulted in chronic incapacitating illness in significant numbers of men who were still attempting to function in their jobs, but also had finally reached the stage where many of these men allowed themselves the luxury of indulging their survival instincts. In other words if the stress of potential mid-air collisions or near-misses excites the fight or flight response, then it is natural one day for the individual to do just that: either fight (demand less stressful

working conditions) or flee (leave the job).

When the "sick-out" of the air traffic controllers is viewed in the clinical context described above, rather than in the pejorative context of the usual labor dispute, a case can be made for a real medical appraisal of the problem. The etiology of ulcer was the same as that of the sick-out: the increasing danger of mid-air collisions as air traffic density increased and controller staffing diminished. As the dangers increased, the stress increased. Peptic ulcers were a manifestation of a problem that was primarily a systems problem. The system of air traffic control had fallen behind the needs of the men operating it.

Summary and Conclusions

1. In the present series, 32.5% of the employees evaluated by the author suffered from duodenal and gastric ulcers which had previously, in most cases, been undiagnosed and untreated.

2. Peptic ulcer in this series is concluded to be a stress-related disease, the stress being occupational. Possibly the most significant recurring stress is the crisis that occurs when an air traffic controller is involved in a narrowly averted mid-air collision of commercial aircraft under his control.

3. It is important to identify stresses in ulcer patients so that intelligent medical management may be instituted. Prevention of ulcer recurrence in this occupational group has far-reaching implications to the safety of the flying public, to the proper functioning of the air traffic control system, and to the economy of the country.

4. Most of these patients initially complained of anxiety states, generally referred to as "nervousness" or a "nervous stomach." It is suggested that all air traffic controllers who complain of anxiety states, nervous stomachs, or chronic diarrhea be evaluated closely for peptic ulcer, gastritis, or duodenitis.

5. There were more ulcer-prone fathers and wives among the group of patients who demonstrated abnormal gastroduodenal X-rays. The significance of this relationship is not known.

6. Smoking cigarettes and cigars was a positive factor in the group with the abnormal gastroduodenal X-ray findings. A causal relationship was not established. ◀

References

1. Krag, E.: "Pseudo-ulcer and True Peptic Ulcer," *Scandinav the Danish Medical Bulletin* 178: 713-728 (Dec. 1965).
2. Monson, R. R.: "Familial Factors in Peptic Ulcer," *Amer J Epide*, Vol. 91, No. 5, May 1970.

Air Traffic Controllers Syndrome

3. Monson, R. R.: McMahon, B. "Peptic Ulcer in Massachusetts Physicians," *New England J Med* 281: 11-5, July 3, 1969.
4. Pell, S. and D'Alonzo, C.A.: "Prevalence of Chronic Disease Among Problem Drinkers," *Arch Environ Health* 16: 679-684, May 1969.
5. Brooks, F. P.: "Stress Ulcer, Etiology, Diagnosis, and Treatment," *Med Clin N Amer* 50, 1447-1455, Sept. 1966.
6. Roseman, R.H., Friedman, M., and Straus, R.: "Coronary Heart Disease in the Western Collaborative Group Study. A Follow Up Experience of Two Years," *JAMA* 195: 86-92, Jan. 10, 1966.
7. Blumenthal, I.S.: "Digestive Disease as a National Problem, 3: Social Cost of Peptic Ulcer," *Gastroenterology* 54: 86-92, Jan. 1968.
8. Gremm, R. L.: "Peptic Ulcer in Airline Stewards," *Aerospace Med* 40: 890-893, Aug. 1969.
9. Weir, R.D., and Backett, E.M.: "Studies of the Epidemiology of Peptic Ulcer in a Rural Community: Prevalence and Natural History of Dyspepsia and Peptic Ulcer," *Gut* 9: 75-83, Feb. 1968.
10. Friedman, E.H., and Hellerstein, H.K.: *Psychomatic Med* 30: 72-86, Jan.-Feb. 1968.
11. U.S. Dept. of H.E.W.: "Chronic Conditions Causing Activity Limitation, US July 1963-June 1965." *Vital and Health Statistics*, Feb. 1969. National Center for Health Statistics. Series 10, No. 5.