

Does age influence normal gastro-oesophageal reflux?

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SUMMARY Prolonged oesophageal pH monitoring is being used increasingly to detect abnormal gastro-oesophageal reflux. To assess the influence of age on normal reflux patterns, a group of 13 young asymptomatic subjects (mean age 22 years) was compared with a group of 14 middle aged asymptomatic subjects (mean age 49 years). An ambulatory system using a radiotelemetry capsule and a portable receiving system was used, oesophageal pH being recorded for at least 16 hours during an overnight hospital stay under standardised conditions. There was no significant difference in the duration or frequency of reflux episodes as defined by pH <5, <4, <3, or as a fall in pH of more than two units. It is concluded that it is an acceptable practice to use young volunteers to establish normal values in reflux studies of young and middle aged patients.

Prolonged pH monitoring of the lower oesophagus is regarded as the most sensitive indicator of abnormal gastro-oesophageal reflux when compared with any other single investigation.^{1,2} Increasingly, the technique is being used to distinguish 'refluxers' from 'non-refluxers'^{3,4} to assess the effect of gastric surgery on the function of the lower oesophageal sphincter,⁵ to assess patients with non-cardiac chest pain⁶ and to evaluate anti-reflux surgical procedures.⁷ Published control data with this investigation, however, are limited and no studies have considered the influence of age on normal reflux patterns. We have carried out oesophageal pH studies under standardised conditions in a group of middle aged asymptomatic subjects and compared their reflux data with that of a group of young control subjects.

Methods

SUBJECTS

The middle aged group was composed of 14 subjects (six women) of mean age 49 years, (range 39-61 years). The young group was composed of 13 subjects (four women) of mean age 22 years (range 19-30 years). All subjects from both groups denied any reflux symptoms, none had suffered from any gastrointestinal tract disease and none consumed excessive alcohol. None of the subjects, either young or middle aged, was taking any drugs. Two of

the young control group smoked cigarettes, while six of the middle aged control group smoked cigarettes.

Prolonged ambulatory oesophageal pH monitoring was carried out with a pH sensitive radiotelemetry capsule (Model 7006, Rigel Research) and a portable receiving system which consisted of a battery operated FM receiver and aerial switching unit. The signal was recorded on a Medilog four channel recorder (Oxford Medical Systems). This method has been described previously.⁸

The oesophagogastric junction was located using a station pull-through technique of oesophageal manometry, and the radiotelemetry capsule was tethered in the oesophagus, 5 cm above the lower sphincter using fine polyvinyl tubing. All studies were conducted during an overnight hospital stay. Subjects were fully mobile, but activity was standardised to allow comparison between the groups. Food and drink of pH <5 were excluded from the diet.

The aerial was worn across the chest throughout the period of pH monitoring, but at night the belt containing the receiver and recorder was placed at the bedside. The 24-hour tape was played back on a Devices MX4 unit with an Oxford PB2 replay module using three PM3 demodulations.

Allowing for periods of signal loss, shown on channel 2 of the recording, the corrected time of recording of pH for both erect and supine periods was calculated. Both the duration (minutes) and number of reflux episodes, defined as a fall in pH for <5, <4, or <3, were recorded. Similarly, the duration and frequency of reflux episodes, defined as a fall of 2 pH units, were noted. All results were

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expressed per recorded hour and reflux data for daytime (erect) and night (supine) were analysed separately.

Results

Corrected median time of pH recording, while erect, in the middle aged group was 8.8 hours (range 8.3–12.2 hours), while median time of supine recording was 8.25 hours (range 6.4–9.6 hours). For the young group corrected median time of recording, while erect, was 8.75 hours (range 6.5–12 hours) and median time of supine recording was 7.5 hours (range 6.5–10 hours). Mean lower oesophageal sphincter pressure in the young control group was 19.1 mmHg, range 8.8–15.7 mmHg. Mean sphincter pressure in the middle age group was 18.2 mmHg; range 10.0–29.9 mmHg. There was no significant difference in mean sphincter pressure between the two groups.

The reflux data for the young and middle aged volunteer were compared using the Mann-Whitney U test. A separate comparison was made of the erect and supine data. The duration and frequency of reflux episodes while erect or supine are detailed in the Table. There was no significant difference between the young and middle aged groups in either frequency or duration of erect or supine reflux episodes.

Discussion

With the increasing use of prolonged oesophageal pH monitoring as a diagnostic test,^{8–11} it is im-

portant to establish normal control values. Scoring systems have been devised for nocturnal reflux episodes and for reflux occurring when erect.^{3 12} Most studies of prolonged pH monitoring have used young control subjects, however, often medical students, whose cooperation is more readily obtained than that of a group of middle aged asymptomatic subjects. Such data from young subjects have frequently been used to define abnormal reflux in middle aged patients with oesophageal or gastric disease. The validity of so doing has not been tested previously.

The present study confirms that normal asymptomatic subjects, whether young or middle aged, experience intermittent gastro-oesophageal reflux. Reflux episodes occur more frequently during the daytime than at night. It is possible that the main underlying mechanism is transient lower oesophageal sphincter relaxation,¹³ as none of our subjects had an abnormally low sphincter pressure or sphincter length.

We have detected no significant difference between young and middle aged asymptomatic volunteers in the pattern of reflux, either while erect or supine. Thus, it is reasonable that young asymptomatic volunteers be used to establish normal values for reflux and that their reflux data be compared with young and middle aged patients under investigation.

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Table Prolonged pH monitoring in young and middle aged asymptomatic subjects. Median (range).

	Erect		Supine	
	Young controls (n=13)	Middle aged controls (n=14)	Young controls (n=13)	Middle aged controls (n=14)
Time pH<5 (min/h)	1.4 (0.35–5.0)	2.37 (0.66–5.39)	0.15 (0.0–2.1)	0.24 (0.0–5.104)
Episodes/h (no) (pH<5)	0.29 (0.08–0.58)	0.36 (0.08–0.71)	0.1 (0.0–0.97)	0.115 (0.0–0.44)
Time pH<4 (min/h)	1.30 (0.31–3.75)	1.98 (0.42–3.21)	0.15 (0.0–0.19)	0.19 (0.0–4.43)
Episodes/h (no) (pH<4)	0.235 (0.08–0.58)	0.305 (0.07–0.71)	0.10 (0.0–0.92)	0.115 (0.0–0.26)
Time pH<3 (min/h)	0.0 (0.0–2.5)	0.39 (0.0–1.71)	0.0 (0.0–1.75)	0.0 (0.0–0.87)
Episodes/h (no) (pH<3)	0.0 (0.0–0.40)	0.22 (0.0–0.36)	0.0 (0.0–0.61)	0.0 (0.0–0.14)
pH fall >2 units (min/h)	1.30 (0.0–4.37)	2.27 (0.0–5.13)	0.15 (0.0–2.0)	0.06 (0.0–4.88)
Episodes/h (no) (pH fall >2 units)	0.22 (0.0–0.76)	0.34 (0.0–0.8)	0.10 (0.0–0.92)	0.06 (0.0–0.40)

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