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Serum Gastrin Levels During Pregnancy

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Serum Gastrin levels were measured by radioimmunoassay in serum samples taken from nongravid normal women and normal healthy pregnant volunteers who were divided into four groups according to gestation time. In nonpregnant control subjects the gastrin values found were 52.23 ± 2.66 pg/ml. The gastrin levels observed from 5 to 15 and from 36 to 42 weeks of pregnancy are similar to the values of control subjects, whilst the gastrin levels found from 16 to 35 weeks are significantly lower. These results could help us to unravel the distressing problem of dyspeptic symptoms from 16th to 35th week of pregnancy.

Many maternal changes in the gastric acid secretion, gastric emptying time and heartburn accompanying the onset of pregnancy, have been reported (1, 5). The mechanism responsible for these changes, despite extensive studies, is still unknown. It was suggested that it might may be due to a combination of factors such as an alteration of the position of the stomach, prolongation of the emptying time and possibly reversed peristalsis which combine to allow the gastric contents to regurgitate into the lower oesophagus and thus produce heartburn. These hypothesis are not supported by HUNT and MURRAY (5), who observed no evidence that the stomach emptied more slowly during pregnancy and that there was a fall in the secretion of acid which reached its lower value at about the 30th week of gestation. On the other hand, it is well known that gastrin is implicated in the gastric acid secretion, in the gastrointestinal motility and also that the smooth muscle of the oesophageal sphincter is influenced by gastrin (3, 4, 6). With the advent of radioimmunoassay (7), conflicting reports have appeared in literature ranging from a slight decrease (8) to a significant increase (2) in serum gastrin levels during pregnancy.

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The present study was undertaken to obtain further information concerning the role of serum gastrin levels on the maternal changes in gastrointestinal physiology during pregnancy.

Materials and Methods

Serum gastrin levels were determined in 19 nongravid normal women volunteers (aged 20-26 years) as control, who besides were not using any oral contraceptive preparation. A group of 95, normal, healthy pregnant volunteers (aged 17-35 years) was also studied. For the purposes of this study, these subjects were arbitrarily divided into groups according to gestation: *Group A* (8 women) were studied between 5th-15th weeks; *Group B* (23 women) between 15th-25th weeks; *Group C* (35 women) between 25th-35th weeks and *Group D* (29 women) after 35th week of pregnancy but before delivery. All pregnant and control subjects had blood withdrawn for study of radioimmunoreactive gastrin following a 10 hour overnight fast. The sera were divided in aliquots and stored at —20° C until assayed.

Serum gastrin concentration was measured in duplicate by sensitive and specific radioimmunoassay, as described by YALOW and BERSON (10) and purchased from *Cea Ire Sorin* (Gastrin radioimmunoassay kit), with synthetic human gastrin I (G-2-17, Imperial Chemical Industries, Macclesfield, England) covalently coupled to bovine serum albumin according to MCGUIGAN (7) and used in a final dilution of 1 : 500,000. Monoiodinated synthetic human gastrin (G-17) was used as tracer and G-17 as standard. The separation of antibody-bound from free hormone was carried out by dextran-coated charcoal and the labeled free and bound hormone was counted in an automatic gamma scintillation counter (Wallac, LKB, Sweden). The coefficient of variation in the method used ranged from 3.8 to 6.2 % for «within assay variation» and from 6.1 to 10.1 % for «between assay variation». The immunoassay system was sufficiently sensitive to detect 10 pg/ml of serum gastrin.

Results

The serum gastrin levels during pregnancy have been studied. The results obtained are expressed as an average ± S.E.M. and significance was evaluated by Student's t test (figure 1). The gastrin values found in nonpregnant control subjects were 52.23 ± 2.66 pg/ml, whilst pregnant women's levels were: *Group A:* 49.03 ± 4.18 pg/ml; *Group B:* 38.46 ± 1.67 pg/ml; *Group C:* 38.65 ± 1.38 pg/ml and *Group D:* 57.72 ± 2.75 pg/ml. The gastrin serum levels showed a significant decrease in Groups B and C (15th-35th weeks) when compared with normal females and the Groups A and D ($p < 0.05$).

Discussion

In this study a significant decrease in serum gastrin levels was observed from

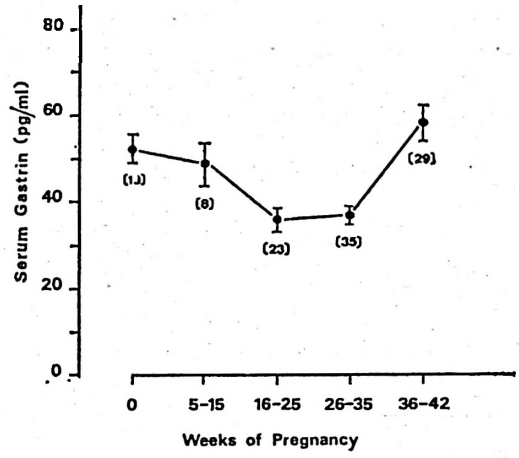

Fig. 1. *Variations in concentrations of gastrin in serum samples during gestation.* Vertical lines represent ± S.E.M. Number of women in each groups in parentheses.

16th to 35th week of gestation. This decrease does not seem to be related to the quantitative variations observed in serum proteins during pregnancy, since TOVEY (9) has not observed significant differences in total protein concentrations through pregnancy. The present results are at variance with the current concept (2, 8); ROONEY *et al.* (8) found a slight decrease in plasma immunoreactive gastrin concentration up to the third trimester when a sharp rise in basal levels of gastrin took place. ATTIA *et al.* (2) observed a significant increase in serum gastrin levels from 15th to 35th week of pregnancy, when a significant increase occurred, reaching the values of the nongravid female control subjects. The results shown in this study could explain the slight fall in the gastric acid secretion during the first 30 weeks of pregnancy observed by HUNT and MURRAY (5), since it is generally accepted that acid gastric secretion is influenced by gastrin levels. This decrease observed in serum gastrin levels could also explain the high incidence of heartburn between 4th-6th month of pregnancy described by ATLAY *et al.* (1) as the smooth muscle of the lower oesophageal sphincter is under gastrin control (3, 4) allowing the gastric contents to regurgitate into the lower oesophagus and thus cause heartburn. It is hoped that these results help to clarify the distressing problems of dyspeptic symptoms observed from 15th to 35th week of pregnancy.

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Resumen

Se estudia por radioinmunoensayo los niveles séricos de gastrina en mujeres normales no embarazadas y en mujeres embarazadas con gestación normal, las cuales son divididas en distintos grupos de acuerdo con la edad de gestación. Los valores séricos de gastrina obtenidos en las mujeres no embarazadas son de 52,23 ± 0,61 pg/ml, y los de las mujeres gestantes entre las 5 y las 15 y entre las 36 y las 42 semanas de embarazo son similares a los observados en las mujeres no embarazadas, mientras que los valores obtenidos entre las 16 y las 35 semanas de gestación son significativamente inferiores que los observados en las mujeres no embarazadas. Estos resultados pueden ayudar a la comprensión de los problemas dispépticos observados entre las 16 y las 35 semanas de gestación.

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