STATISTICAL EVALUATION OF EIGHT YEARS OF ULTRASONIC METHODS IN PREGNANCY

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SUMMARY

The Authors report their extensive number of cases (7207 ecographs) deriving from the use of ultrasonics in obstetric between 1970 and 1977 at the Obstetric and Gynaecological Clinic of the University of Padua.

Their experience has led them to entrust the performance of this examination to the specialist obstetrician who follows the patient's clinical course, in addition to visiting her.

The diagnosis and monitoring of pregnancy by means of ultra-sound in obstetrics should be a routine procedure, so as to ensure the maximum assistance to the pregnant woman and especially to the embryo and later the foetus. It is also considered necessary to perform more examinations during the course of pregnancy in order to assess in good time any disorders of growths.

The analysis of the graphs shows that ecography in midwifery makes use of a simple, harmless method in order to monitor pregnancy.

Interest in ecographic methods is growing both among obstetricians and radiologists. We have therefore considered appropriate to analyse our obstetric experience in the Department of Ultrasonic Diagnosis of the Obstetric and Gynaecological Clinic of the University of Padua, between 1970 and 1977.

We examined 5058 out-patients and patients admitted both to this hospital and to other Obstetric Departments in the Veneto region, upon whom altogether 7207 ecographies were performed.

Table 1 shows the ecographies that were performed during the period under consideration, subdivided year by year. As will be seen from an analysis of the graph, we had an increase of 15.9% after the first year of activity. This increase became more marked in subsequent years (63.6% in 1972; 57.6% in 1973; 15.1% in 1974). In 1975 there was a diminution of 26.3% as compared to the previous year, due to a period when the apparatus was out of commission. In 1976 the increase reached its maximum 83.8%, with 1855 obstretic ecographs performed. In 1977 the apparatus ceased to function due to an advanced state of wear and tear; we performed only 460 examinations during the first three months of the year. The increase observed could be ascribed to the following factors:

1) knowledge of the method either by the doctor requesting it, or by the patient;

2) technical experience of the operators;

3) improvements in the apparatus;

4) necessity for a new diagnostic aid.

We therefore analysed the age of the patients, which was found to be between 14 and 48 years. These patients were subdivided into five "obstetric risk group" as suggested by Bompiani: this has been used in our hospital for some time (table 2).

No statistically significant variations existed between the histograms for each year, even though the percentages of the individual groups under consideration did

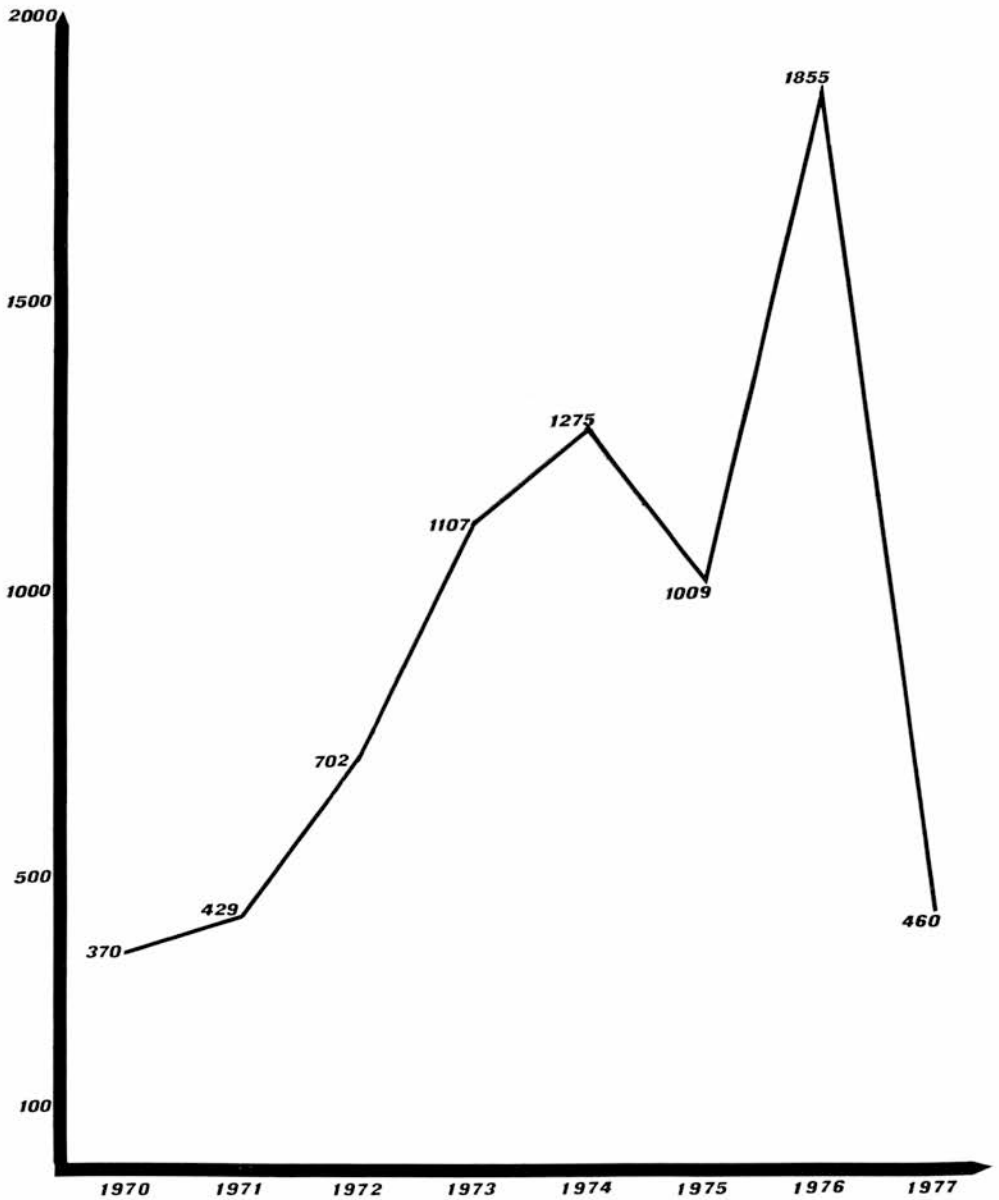


Table 1. — Obstetric echographies carried out in years 1970-1977 in the Obstetric and Gynaecological Clinic of Padua University.

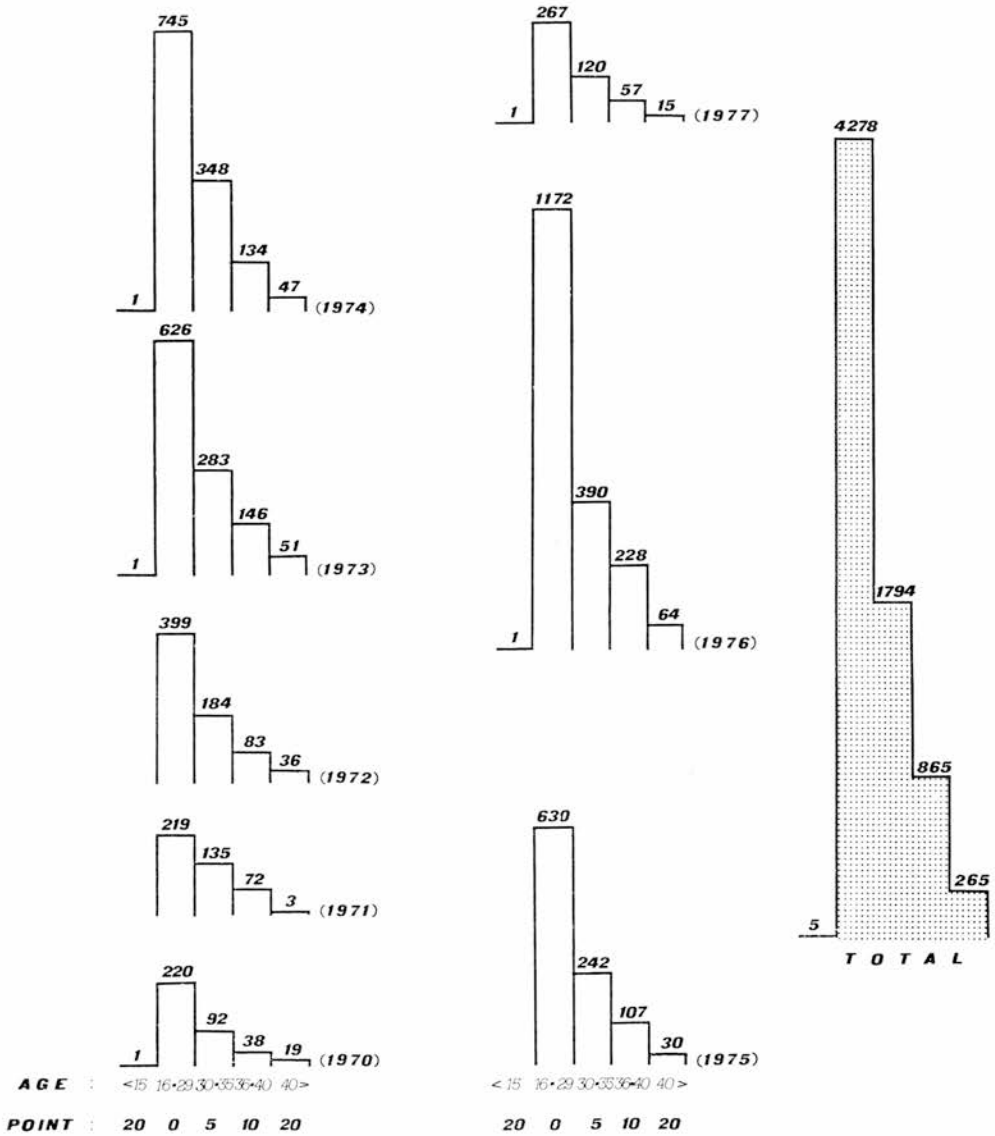


Table 2. — Echographies carried out patients with various age-risk.

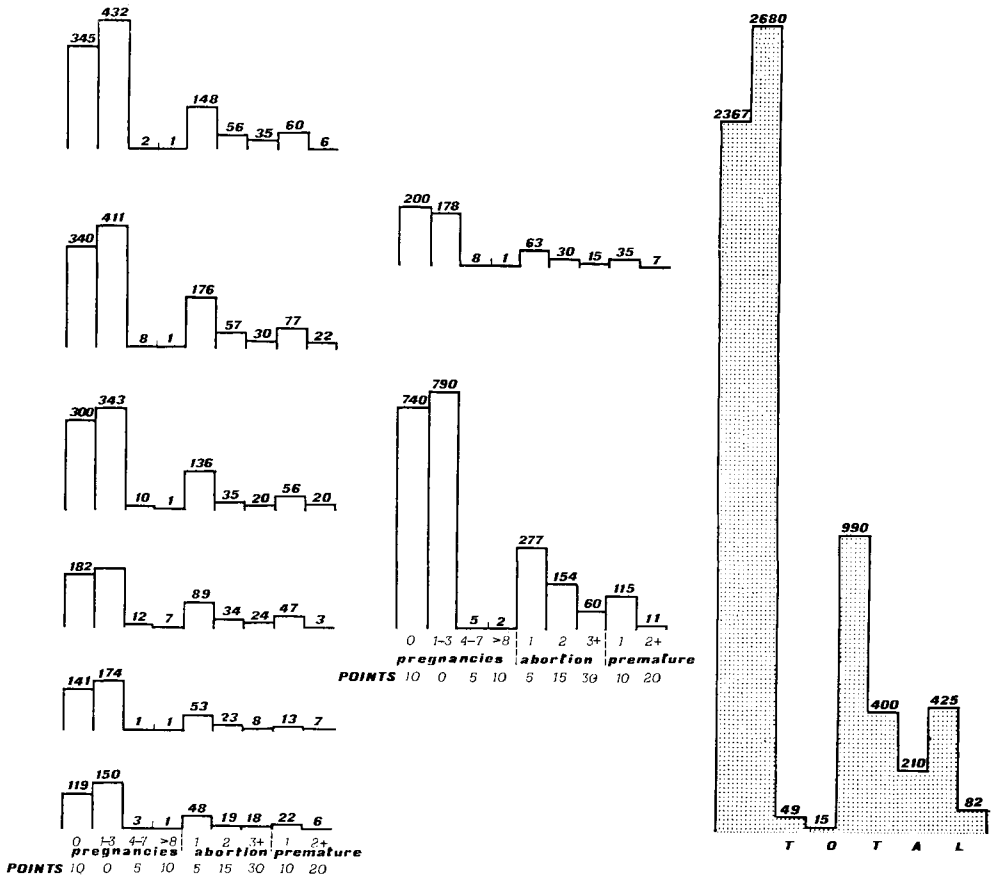


Table 3. — Echographies analysed according to parity of our patients.

vary; but this variation related only to the annual increase of ecographs performed. In addition, the number of examinations made was inversely proportional to the gravity of the risk, the number of "high risk" patients being less. This, of course, applied also to the other parameters taken into consideration subsequently.

In table 3 we have taken into account the past history assessments (parity) of the patients who underwent ecographic examination. On analysing the graphs it was found that there was no statistically significant disparity between the number of ecographs performed as between nulliparae (32.8%) and multiparae (1-3 pregnancies: 37.12%), while the percentage was markedly lower (0.9%) in patients with four or more pregnancies.

57 patients who had a history of premature delivery were monitored and divided into two "risk groups" depending on the presence of one, or two or more, premature deliveries in the history: this showed that 83.82% of these patients belonged to Bompiani's first group (10 points of risk), while the remainder were in the second group (20 points). Finally, the percentage of patients with only one abortion in the history was found to be much lower

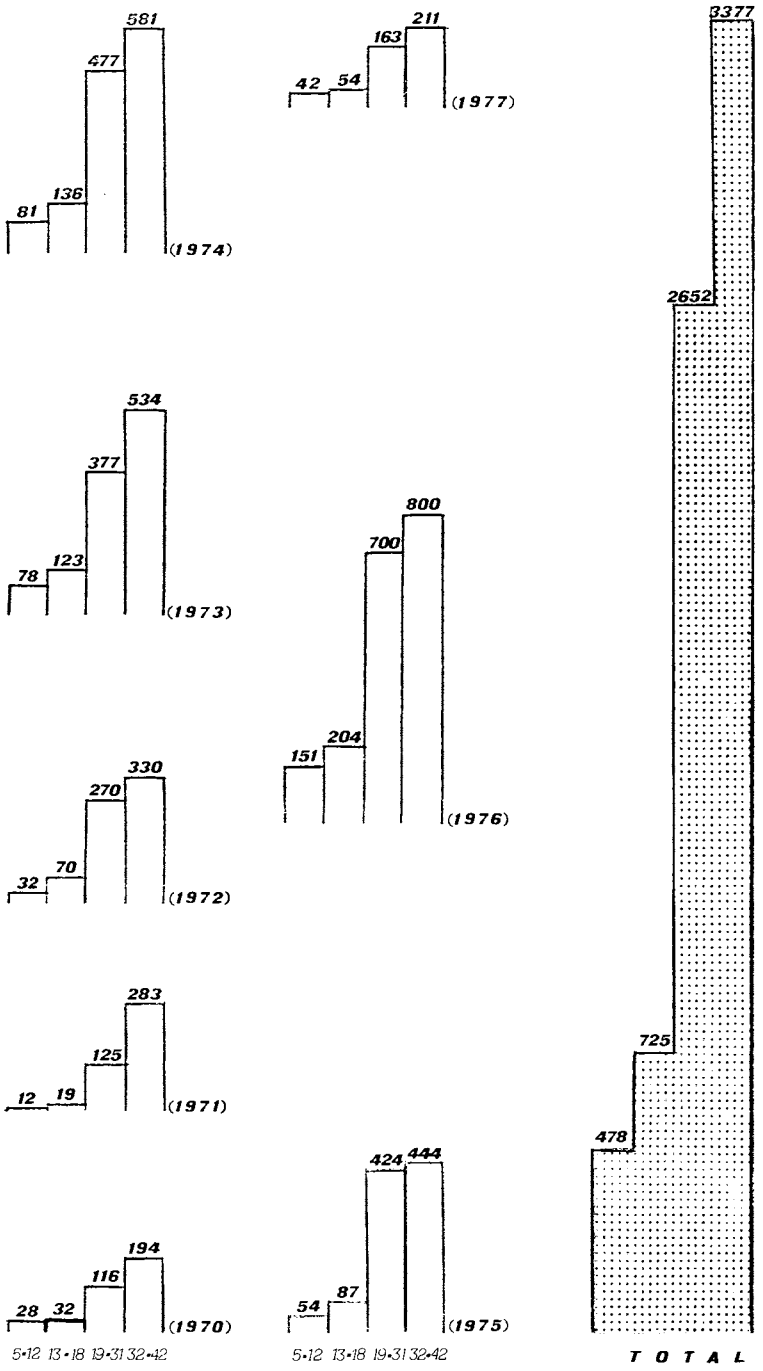
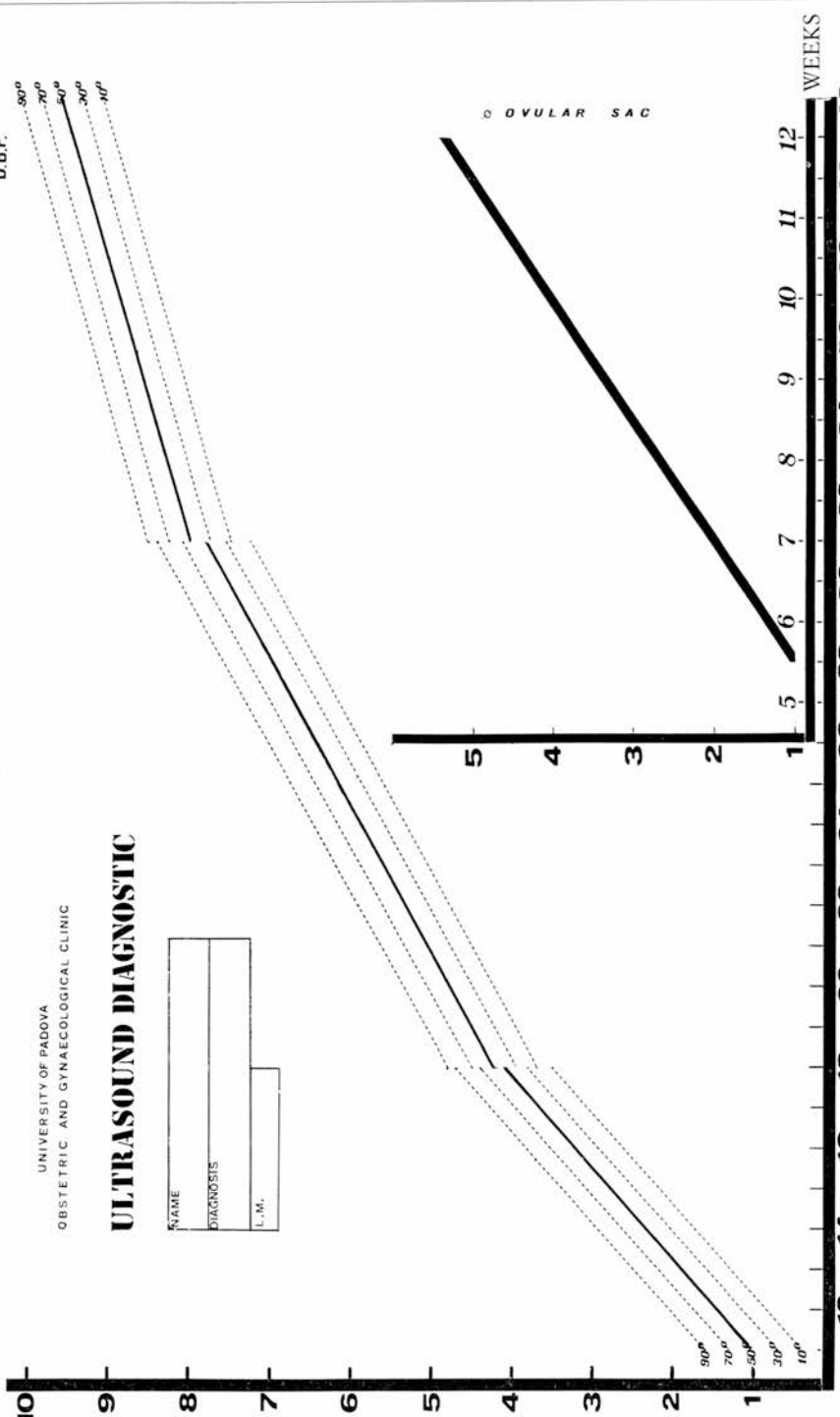


Table 4. — Echographies carried out in four periods embryo-fetal development, according to the broken line of growth in use in our centre.


D.B.P.
90°
70°
50°
30°
10°
WEEKS
O OVULAR SAC
UNIVERSITY OF PADOVA
OBSTETRIC AND GYNAECOLOGICAL CLINIC
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DIAGNOSIS
L.M.

Table 5.

(61.87%) than that with two or more abortions (25%; 13.12%).

In table 4 we have considered the various weeks of pregnancy in which the ecographies were performed, subdividing them according to the schemes suggested by some Authors [1, 2, 3] (table 5) into four periods: 5th-12th week; 13th-18th week; 19th-31st week; 32nd-42nd week. The greatest number of ecographies was carried out during the last period of pregnancy, while during the first period (5th-12th week) we performed only 478 ecographies, or 6.6%. This disparity was not of a technical nature, but was due to the fact that many patients and many doctors believe that an ecographic examination performed too early may be injurious to the foetus, and/or that it is of no value diagnostically, or again because some cases of amenorrhoea are not taken into consideration until pregnancy has started.

Out of a total of 5058 patients, 25.75% had undergone the test more than once during the same pregnancy. This finding is very important, since a single ecography can result in only one point being plotted on the growth curve; but an infinite number of straight lines may pass across it, and therefore it is not "eutrophic or dystrophic growt" that is being expressed, only a momentary and non-dynamic finding concerning the state of the foetus. It is therefore our firm conviction that ultrasonic monitoring in pregnancy shoul take into consideration at least two controls; two points can then be plotted joined by a straight line which will enable us to express a reliable prognostic judgment (depending on whether it is parallel or incident to the theoretical pattern) (table 5).

Of course, if the "risk" to the patient is increased, we must also increase the number of ecographic checks, reaching a weekly control in the case of patients admitted to hospital. This is the minimal value for assessing embryonic and foetal growth. Finally it should be noted that 2% of ecographs were performed several times in successive pregnancies.

Our eight years' experience of ultrasonic diagnosis [4, 5, 6, 7] is based on an apparatus with the following properties:

single memory static image
T.M.: A-scan; B-scan
adjustable speed
electronic scale
contact compound scanning technique.

The apparatus, acquired in 1968, was an "ultra-sound" apparatus effective for the most dissimilar uses (obstetrics and gynaecology, internal medicine, cardiology, neurology). Today, as techniques have become more refined, it is possible to acquire an apparatus related to the use to which it will be put.

On the basis of our experience, we consider that an apparatus used for the daily requirements of obstetrics and gynaecology should have the following properties:

real time
grey scale
electronic marker with digital reading of distances
A-scan
head easily manoeuvrable
adjustable speed
possibility of enlarging details.

In addition, we hope that further modifications we have suggested can be carried out technically:

acoustic Doppler effect, linked to T.M.
electronic marker for oblique and transverse measurements
possibility of demonstrating the foetal image *in toto*, especially towards term of pregnancy
flexible electronic transducers for attachment to the abdominal wall.

As regards the performance of the ecographic test, we consider that the operator should be a medical specialist in the field in which he is working, since he must be competent to assess directly the most varied images that can be presented [8, 9, 10, 11]. Precisely for this reason, we are of the opinion that in a large centre, the specialist clinics involved should have the apparatus adapted for their own use (cardiology, midwifery, etc.), leaving a centralized service to the smaller hospitals.

Finally we have found that a considerable number of patients receive ecogra-

phic examinations for undoubtedly valid reasons, but a certain number only because these have been suggested to them. We ourselves record the foetal heart beat by auscultation, request a picture which we construct on a suitable monitor, take a photograph of this image and, most important of all, we send a written reply immediately.

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