

## Chorion biopsy

Advantages, reliability and risks

C. GIORLANDINO (\*) - A. VIZZONE (\*) - P. GENTILI (\*)  
A. CALUGI (\*) - A. COLICCHIA (\*\*) - M. CAMPANA (\*)

**Chorion biopsy: practical advantages, reliability and risks.** — 161 women in their seventh to twelfth week of pregnancy, who for social reasons wanted an abortion, underwent our study in order to evaluate the actual advantages, accuracy and risks of chorion biopsy.

Sampling was carried out under continuous sonographic monitoring, without anaesthesia, using a semi-rigid cannula connected to an aspirator with a syringe. In 26 cases (16.1%) it was impossible to introduce the cannula; in 10 (6.2%) no tissue was obtained during biopsy; in the remaining 125 cases (77.6%) enough tissue was obtained for histological and chromosomological analysis. Regarding the quantity and the purity of the sample, the maximum reliability occurred between the eighth and the tenth week (79% of villous tissue).

Moreover, during these weeks the risk of abortion was at its lowest level (5%).

However it should be noted that the 83.9% of the women were able to undergo the biopsy (the remaining would have had to undergo anaesthesia). It also appears that the eighth, ninth and tenth week are the most appropriate to this study.

Experience and skill of the operator, collaboration of the research staff, and especially co-operation from the patients are essential to the success of chorion biopsy.

KEY WORDS: Abortion, prenatal diagnosis.

## Introduction

Chorion biopsy opens a new epoch in prenatal diagnosis<sup>1-4</sup>. Several authors have

considered the possibility of obtaining prenatal diagnosis of chromosomal and enzymatic<sup>5</sup> disorders using this method. However, very little literature is available on the real usefulness and reliability of C.B. on the one hand. In our study, we made an attempt to verify the usefulness of this method in prenatal diagnosis routine practice. With this aim, our criteria for selecting pregnancies to undergo C.B. were very strict, so that the incidence of abortion not due to C.B. would be limited to a minimum.

(\*) Department of Obstetrics and Gynecology, Roma, II University Medical School, «Tor Vergata», Rome.

(\*\*) St. Anna Hospital, Rome.

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Per la corrispondenza: Prof. Antonio Vizzone, Via Guidobaldo del Monte 39, Roma.

## Materials and methods

Our research was done on 161 white women who for social or economical reasons had requested voluntary termination of pregnancy. These women, having been informed about the scientific aim of our study, agreed to collaborate. Selected pregnancies ranged from seventh to twelfth week. Subjects' ages were 18 to 42; 39 (24.2%) were nulliparous. In all cases the scanning showed live embryos to have crown-rump length normal for gestational age and normal HCG plasmatic levels. There were no signs of either miscarriage risk or maternal disease.

Sonographic examination, in real time, was carried out on our patients — always with a medium to full bladder — during each biopsy. The following ultrasonic equipment was used:

- Aloka SSD 256 with a 3.5 MHz linear probe.
- ROCHE ABDOSCAN with a 3MHz linear probe,
- ATL MK 500 with a 3.5 MHz sector scanner.

No anaesthesia was used.

After disinfecting the vagina, a vaginal speculum was inserted. The cervix held by Tiemann's forceps was lightly pulled out. For the biopsy, a straight sterile stainless steel cannula

was used. Our cannula was semiflexible, with a blunt tip, and measured 18 cm; its external diameter was 3 mm (fig. 1). The cannula was attached to a 50 cm flexible rubber tube, connected to a 20 cc syringe. In only 23 cases (14.2%) it was necessary to perform a minimal dilation of the cervix using a neoplex dilator (Porges France 8D 108 n. 14). The shape of our cannula was modified in each case, according to the position of the chorion, which was located by scanning.

After the cannula had reached the uterine cavity under careful sonographic monitoring, the tip of the cannula was directed toward the echorich tissue, connected with the gestational sac, which represents the sonographic appearance of chorion frondosum.

When the chorion was reached (fig. 2), a rapid aspiration was performed with a syringe, thus obtaining a first specimen. If in the first sample, no compact tissue was found, only a second and final attempt was made.

The sample was put into a test tube with a sterile saline solution, having rinsed the contents from the aspirator. The sample was weighed by comparing the test-tube's weight before and after its filling.

The suspension was put into a centrifuge at 1000g for three minutes, the supernatant was discarded and the pellet was examined by phase-

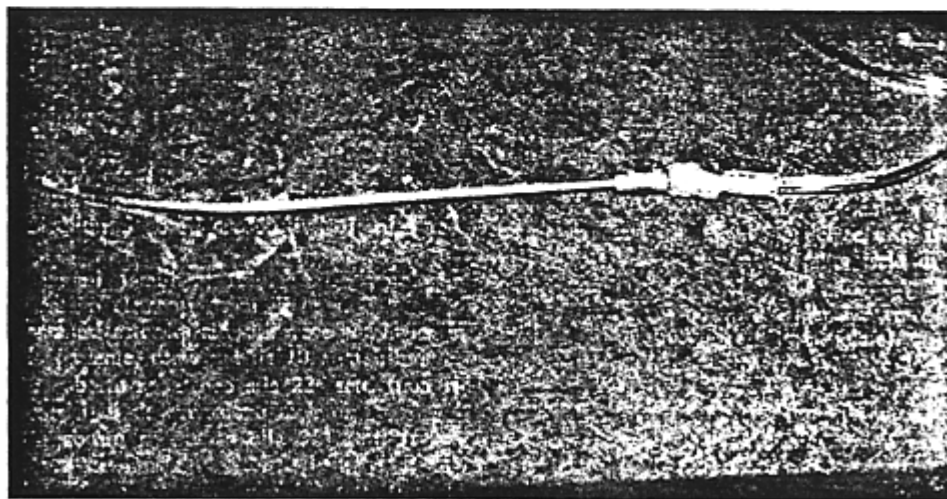


Fig. 1. - Aspiration cannula sampling method.

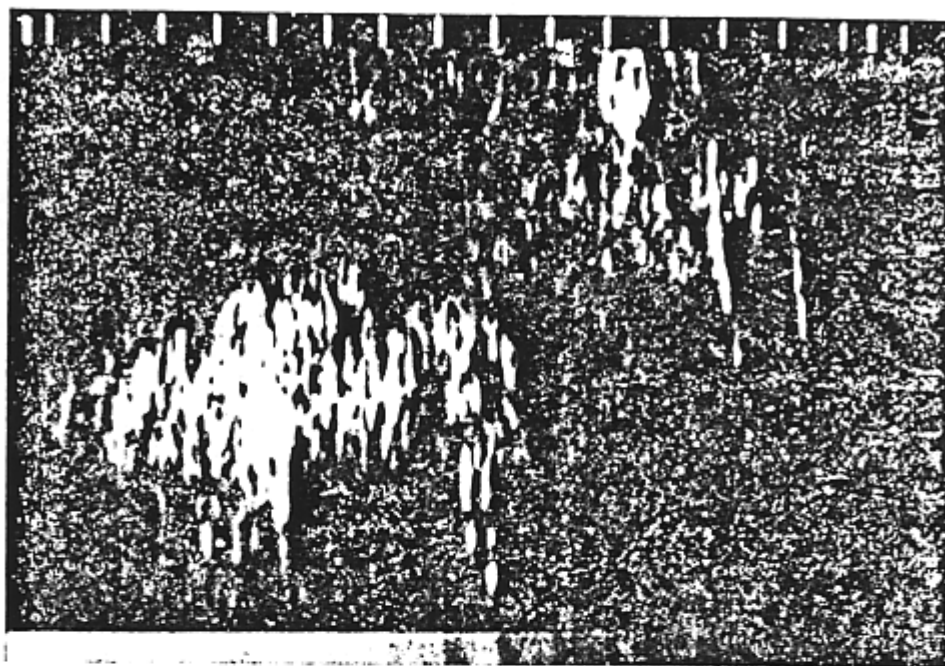


Fig. 2. - Sonographic picture of chorion frondosum biopsy using real time equipment; ch: chorion; gs: gestational sac; c: cannula.

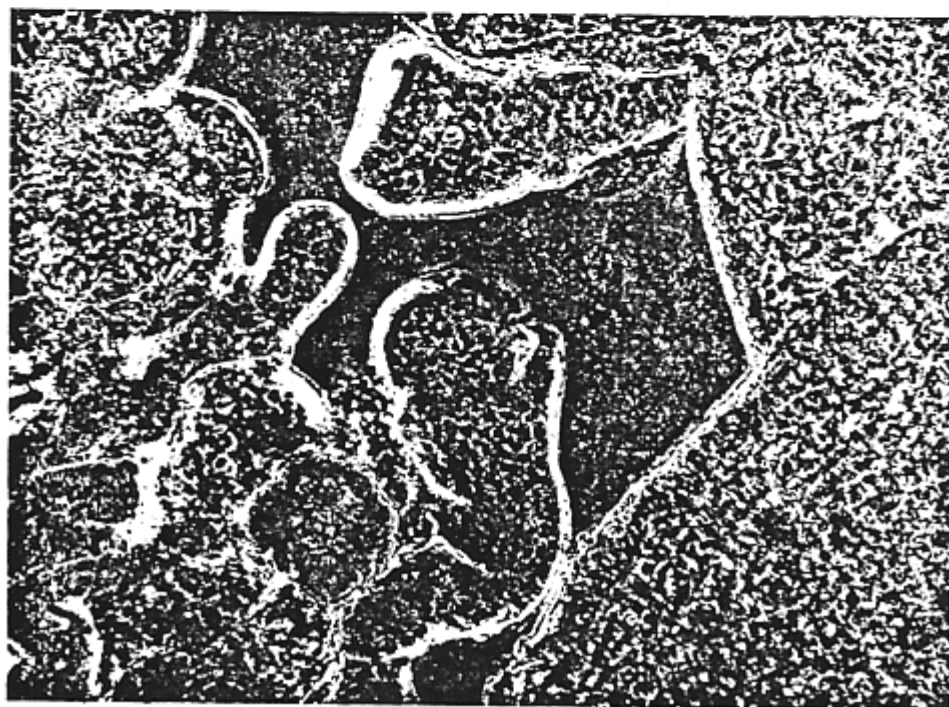


Fig. 3. - Chorionic villi, phase contrast microscope (26X).

contrast microscopy (fig. 3.). Part of the tissue was fixed and embedded in paraffin for histological studies. The rest was put into a liquid culture-medium for chromosome studies.

Histological tests were carried out by a specialist using random samples in five different microscopes (40x). The results showed the percentage of villi and other tissues. After the C.B., we evaluated the possibility of complications using clinical, biochemical and sonographic monitoring for a period of time varying from one to three weeks. The condition of two women who decided not to terminate their pregnancies was followed up by throughout gestation.

These subjects underwent amniocentesis at the sixteenth week and the chromosomal studies were performed in the same way as the C.B.

## Results

### Usefulness

Of the 161 women who accepted to undergo C.B., in 26 cases it was impossible to do a biopsy for the following reasons:

a) patients' refusal to co-operate during the procedure (five cases)

b) impossibility of reaching the uterine cavity: i) due to cervical tension; to overcome this would have required a more forceful dilation than the woman could have easily supported (14 cases); ii) due to fibromatosis (3 cases); iii) due to cervical hypertrophy (1 case).

c) impossibility of reaching chorion due to uterine malposition (3 cases).

In 23 cases, a slight, non-traumatic dilation of the cervix was necessary. In the remaining 135 cases (83.9%) neither correct insertion of the cannula nor chorion sampling presented any particular problem.

### Reliability

Reliability was evaluated by measuring the quantity and judging the quality of the sample.

As previously described, the quantity was evaluated by weight. Of the 135 samples, in ten cases (7.4%), carried out at the beginning of the research, no chorion tissues was found. (Tab. 1.) In the other 125 cases (92.6%) a sufficient specimen was obtained. The average weight of the samples which contained villi, decidua, blood vessels and mucous strands was 1.38 grams immediately after the C.B.

The villous specimen was first qualitatively evaluated by means of a phase-contrast microscope, and then histologically evaluated. (Tab. II).

Quantitatively we obtained more villous tissue as the pregnancy advanced (Tab. II) The purest villous tissue was obtained between the eighth and the twelfth week. During the seventh week, we noticed very little villous tissue and a certain amount of decidua. In samples taken between the eleventh and the twelfth week, the greatest amount of blood contamination, mucous strands and vessels as well as less decidua was found. At this stage of gestation, frequently no samples were obtained.

TABELLA I. - Percentage of failure in obtaining specimens during biopsy, according to the week of pregnancy.

Weeks	Total number	Failures to obtain specimens	%
7 <sup>a</sup>	20	2	10%
8 <sup>a</sup>	25	—	—
9 <sup>a</sup>	33	1	3%
10 <sup>a</sup>	24	1	4,1%
11 <sup>a</sup>	20	4	20%
12 <sup>a</sup>	14	2	14%
Total	135	10	7,4%

TABELLA II. - The table shows only cases in which enough material was obtained.  
A week by week break-down of sampling is reported chronologically.

Week	N. of cases	% Villi	% Other	Weeks Follow-up	Abortion		Sample weight gr.
					Spontaneous miscarriage	Induced	
7 <sup>a</sup>	18	62.7	37.3	2.06	2 (11%)	16 (89%)	1.06
8 <sup>a</sup>	25	77.6	22.4	1.96	1 (4%)	24 (96%)	1.08
9 <sup>a</sup>	32	81.7	18.2	1.90	2 (6%)	30 (94%)	1.30
10 <sup>a</sup>	23	70.8	29.2	1.54	2 (5%)	20 (95%) *	1.53
11 <sup>a</sup>	16	56.2	43.8	1.00	2 (12%)	14 (88%)	1.73
12 <sup>a</sup>	11	60.0	40.0	1.00	1 (10%)	9 (90%) *	2.02

\* One case of pregnancy prosecution at 10<sup>a</sup> and 12<sup>a</sup> week.

### Risks

Risks were involved in taking C.B. samples with our technique were defined by the following criteria:

a) amount of bleeding caused by the insertion and removal of the cannula and early symptoms of abortion during the days after sampling;

b) sonographic monitoring of fetal conditions, judged by fetal growth;

c) sonographic findings of structural and morphological changes (e.g. maetoma, deformed or broken sac, etc.).

In one case miscarriage was due to rupture of gestational sac; in other eight cases, miscarriage was preceded by pain and bleeding with abnormal sonographic findings (e.g. low implantation of the sac, maematoms, small sac, dead fetus, etc..)

There were no miscarriages during the first week after the procedure.

In each of the 125 cases subjected to C.B. all complications were evaluated. The ten cases in which it was impossible to obtain a sample, were excluded.

Each patient was injected with HCG sub-unit two hours before and two hours after the C.B. There was no statistically significant difference. However the rapid HCG changes cannot be used as an index of trophoblastic damage, because the half-life of HCG is rather long.

Evaluating the abortion risk, our results show that the time of pregnancy in which there is the least risk of miscarriage is between the eighth and the tenth week (average risk 11.1%).

Most complications other than miscarriage were found during the twelfth week.

## Conclusions

Although our research is still limited, we believe it is already possible to say that C.B. has the following advantageous characteristics:

— it can be widely used: no problems were found in the 83.9% of the cases in which C.B. was performed;

— reliability (depending mainly on the skill of the operator and the week of gestation). From the eighth to the tenth week, an average of 79% of chorionic tissue was obtained for every aspiration.

This villous tissue was easily separated from decidual debris by means of micromanipulation. It provides a good quantity of chorionic tissue for chromosomal studies.

## RIASSUNTO

Gli AA. hanno esaminato 161 donne, tra la 7<sup>a</sup> e la 12<sup>a</sup> settimana di gravidanza, che, per ragioni sociali, desideravano abortire al fine di valutare i vantaggi, l'attendibilità ed i rischi della biopsia del corion.

Gli esami sono stati effettuati in monitoraggio continuo sonografico, senza anestesia, utilizzando una cannula semirigida, collegata, mediante una siringa, ad un aspiratore.

In 26 casi (16,1%) fu impossibile introdurre la cannula e in 10 casi (6,2%) non fu possibile ottenere dalla biopsia alcun tessuto. Circa la quantità e la parità del campione ottenuto nei restanti 125 casi (77,6%), la massima attendibilità si riscontrò nei campioni (che furono anche quelli che presentarono il più basso grado di rischio) prelevati tra l'8<sup>a</sup> e la 10<sup>a</sup> settimana di gravidanza.

Dall'esame effettuato si è riscontrato che l'esperienza dell'esecutore, la collaborazione dello staff tecnico e, soprattutto, la cooperazione dei pazienti si sono dimostrati elementi indispensabili per la riuscita dell'esame.

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