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The importance of amnioscopy in the supervision of the pregnant woman at risk: Retrospective analysis of 4277 cases

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In 1962 SALING performed the first amnioscopy and in 1963 presented the first results [4, 13]. Subsequently numerous publications confirmed the clinical importance of amnioscopy [2, 5, 8, 10, 11]. Yet, there still exist doubts as to the value of amnioscopy in the routine control of the pregnant woman at risk.

The cause of this apparent contradiction is the fact that amnioscopic control must be part of the daily routine in the outpatient department: In fact amnioscopy must be repeated every 48 hours [8]. This is not easily accepted and as a result amnioscopy is not performed periodically, that is at fixed time intervals, and so in the end its reliability cannot be fully valued.

Since 1967 amnioscopy has been included in the daily routine of our clinic [5]: Retrospective analysis of cases studied has been carried out with the idea of more clearly defining the clinical significance of this method, which is surely among the most simple ante-partum fetal monitoring techniques.

1 Material and methods

About 19.000 pregnant women were controlled between April 1967 and December 1975 (Fig. 1). Four thousands were included in this studies: 2000 of them (group A, Fig. 1) under amnioscopic control from 1. 1. 1968 to 30. 8. 1969 and 2000 (group B, Fig. 1) from 4. 6. 1974 to 24. 3. 1975.

GROUPS CONSIDERED

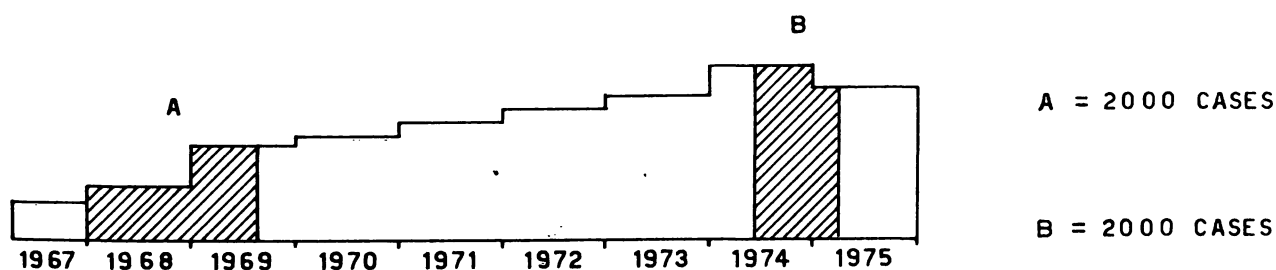


Fig. 1. No. of cases supervised by amnioscopy: 19.050 (April 1967 – December 1975)

In addition to this 348 cases of diabetic pregnant women, supervised by amnioscopy from 1967 to 1975, were analysed (71 among them belong to groups A and B): They represent 79.3% of all those treated in the Diabetologic Center for pregnant women of our clinic.

180 diabetic mothers belong to class A (latent diabetes) and 168 to the other classes (clinical diabetes) (Tab. I). A very strict metabolic control of maternal diabetes was maintained, administering increasing amounts of insulin until the maximal individually tolerated dose was reached (P.H.I.T.) [6].

The amnioscopy and technique used in the examination were those proposed by SALING [4]. In general, amnioscopic control began after the 35th week and, in prolonged pregnancies, after the 280th day of amenorrhea. The amnioscopic examination was repeated on alternate days.

The test was positive if amniotic fluid (A.F.) was stained and/or sparse absent. Labour was induced when the amnioscopic test was positive or when additional risks for the fetus were ascertained by means of other tests. From this point of view, group A and B were different: At the time we collected group A cases, only the urinary estriol level was a routine test in our clinic; other tests had been added in the time period of group B (L/S ratio ultrasonic biparietal diameter, HPL levels, oxitocin challenge test, etc.); when FHR monitoring too was available for intensive labour assistance.

The decision to induce labour in postmature (P.M.) and diabetic patients was taken only on the basis of the amnioscopic result. The

amnioscopies of group A were performed by three qualified obstetricians, one of whom carried out the amnioscopies of group B with two other colleagues.

2 Results

2.1 Number of cases supervised by amnioscopy (Fig. 1)

The number of pregnancies at risk controlled by amnioscopy progressively increased over the years, so that it nearly doubled from 1968 to 1975; in fact the 2000 cases of group B were followed over a period of time that is almost half the one of group A.

2.2 Wrong diagnosis (false positive). Amnioscopy impracticable and accidental rupture of membranes

False positive cases (stained A.F. not confirmed by amniotomy) were 13 (0.3%). Data referring to false negative cases is not available (clear A.F. not confirmed within 12 hours) because not every pregnant woman entering our clinic for labour is supervised by amnioscopy (admission amnioscopy) [8].

Amnioscopy was impracticable in 24 patients (0.6%) and accidental rupture of membranes occurred in 18 patients (0.4%).

2.3 Number of amnioscopies and indications (Fig. 2)

In 4000 cases 9431 amnioscopies were carried out: An average of about 2 amnioscopies each. Postmaturity was by far the most frequent indication both in group A and in group B.

Tab. I. Pregnant diabetic women (1968-75) supervised by amnioscopy

WHITE'S CLASSES						
A	B	C	D	E	F	
180	71	14	31	41	11	348

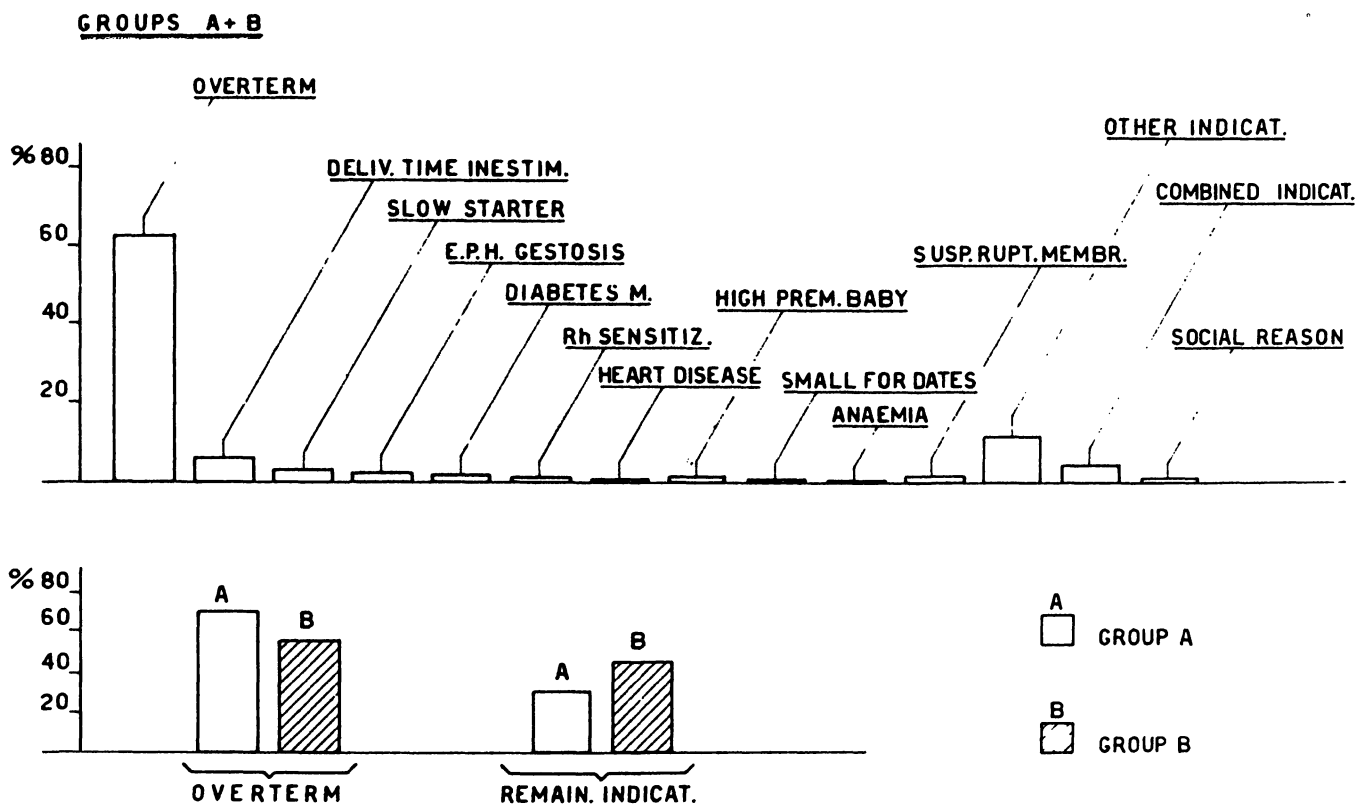


Fig. 2. Amniocentesis indications

A relative decrease in the percentage of cases in group B in comparison to group A is clearly explained by the increase of other indications for amniocentesis.

2.4 Incidence of cases with stained and/or sparse-absent A.F.

The percentage of stained and/or sparse-absent amniotic fluid was identical in groups A and B (13%) (Tab. II).

The percentage of cases with A.F. stained and/or sparse-absent in diabetic mothers was nearly the same: 12.6% (Tab. III). Diabetic patients belonging to classes B-F had a higher incidence of stained and/or sparse-absent A.F. in comparison to those belonging to class A: This difference is not statistically significant.

The percentage of cases with stained and/or sparse-absent A.F. in P.M. pregnancies was significant (9.1%) the first 5 days beyond the 280th day of amenorrhea and became higher as the P.M. days increased until the 15th day (Fig. 3). After the

16th day of P.M. the percentage of cases with stained and/or sparse-absent A.F. decreased, probably as a consequence of an increasing number of wrong determinations of the last menstruation (Fig. 3).

2.5 Method of delivery

Both in group A and in group B the percentage of caesarean sections (C.S.) is higher in the patients with stained and/or sparse-absent A.F. in comparison to that we registered in clear A.F. cases. The incidence of C.S. in group B is lower than that in group A, both in cases with clear A.F. and those with stained and/or sparse-absent A.F. (Tab. IV). In respect to diabetic mothers most of them were delivered at term (Tab. V); this is true both for diabetic patients of class A and classes B-F. Labour was induced in 44 diabetic pregnant women out of 348 (43 with stained and/or sparse-absent and 1 with clear A.F.).

Tab. II. Incidence of stained (or absent) amniotic fluid in cases supervised by amnioscopy

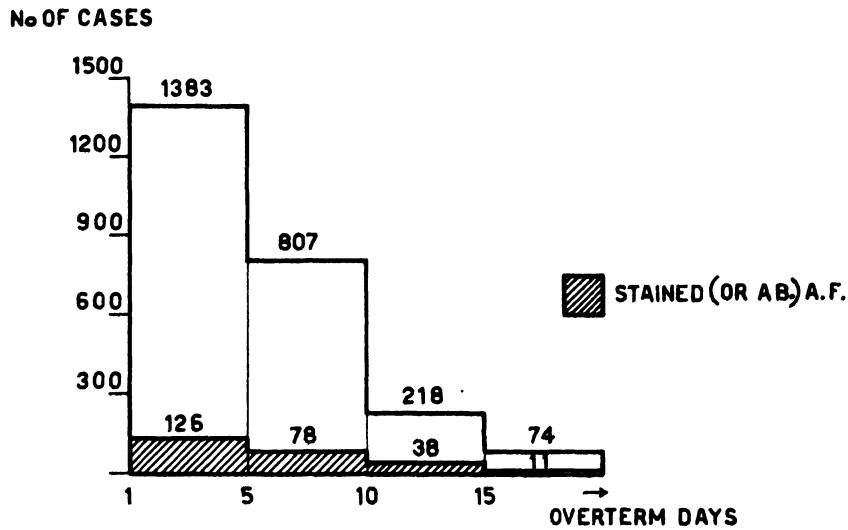
INDICATIONS	TOTAL NUMBER OF CASES		STAINED (OR AB.) AMNIOTIC FLUID	
	GROUP A	GROUP B	GROUP A	GROUP B
OVERTERM	1393	1089	182	150
DELIV. TIME INES.	129	88	12	7
SLOW STARTER	54	73	7	18
E.P.H. GESTOSIS	32	80	2	7
DIABETES M.	15	71	1	9
RH SENSITIZ.	47	28	8	9
HEART DISEASE	13	14	0	0
HIGH PREM. BABY	25	41	3	6
SMALL FOR DATES	9	19	3	3
ANAEMIA	2	2	0	0
SUSP. RUPT. MEM.	42	41	11	8
OTHER INDICAT.	112	364	4	27
COMBINED IND.	95	74	25	14
SOCIAL REASON	21	3	0	0
	1989	1987	258	258
			13%	13%
AMNIOSC. IMPOS.	11	13		
TOTAL	2000	2000		

Tab. III. Pregnant diabetic women supervised by amnioscopy incidence of stained (or AB.) amniotic fluid

WHITE'S CLASSES	No OF CASES	STAINED (OR AB.) AMNIOTIC FLUID
A	180	18 (4)
B → F	168*	26 (6)
TOTAL	348	44 (10) 12.6%

() SLOW STARTER NS = $p > 0.05$

* 1 AMN. IMPOS.



OVERT. DAYS	No OF CASES	STAINED (OR AB.) AMN. FL.	
		No OF CASES	%
1-5	1383	126	9.1
6-10	807	78	9.7
11-15	218	38	17.4
16 →	74	11	14.9

NS }
 NS }
 NS }
 NS }

NS = $p > 0.05$
 SS = $0.001 < p < 0.01$
 SSS = $p < 0.001$

Fig. 3. Overt term pregnant women (groups A and B) supervised by amniocopy incidence of stained (or AB.) amniotic fluid in overterm days

Tab. IV. Cases supervised by amniocopy
 Clear A.F.: Group A 1731 - Group B 1729
 Stained (or AB.) A.F.: Group A 258 - Group B 258

AMNIOTIC FLUID	FHR MONITORING		CAES. SECTION	
	GROUP A	GROUP B	GROUP A	GROUP B
CLEAR	42 (2,4%)	385 (22,3%)	205 (11,8%)	147 (8,5%)
STAINED (OR AB.)	21 (8,1%)	188 (72,9%)	90 (34,8%)	56 (21,7%)

Tab. V. Pregnant diabetic women supervised by amnioscopy: Delivery time

WHITE'S CLASSES	WEEKS OF AMENORRHEA						TOTAL
	33-34	35-36	37-38	39-40	41 →	?	
A	0	1	20	116	35	8	180
B → F	1	3	31	96	27	10	168
TOTAL	1 (0.3%)	4 (1.1%)	51 (14.7%)	212 (60.9%)	62 (17.8%)	18 (5.2%)	348

On the basis of other clinical considerations, pregnancy was not interrupted in only one diabetic patient (class F) with stained A.F., and intrauterine fetal death occurred. In another case (patient class F, 43 years old, para 8) with clear A.F. labour was induced in the 35th week because of a worsening renal function.

In all, 78% of diabetic patients were delivered after the 38th week and 17% after the 40th week: 68% were delivered spontaneously and for only

20% of them did we have to resort to C.S. (in 6% of all patients the C.S. was performed in pluriparae with preceding C.S. deliveries).

2.6 Perinatal mortality

Perinatal mortality not corrected (including cases of feto-neonatal weight ≤ 1000 g) in group A and group B was 8.60‰ (Tab. VI).

There was a decrease in perinatal mortality rate passing from group A to group B (from 7.5‰ to

Tab. VI. Perinatal mortality in cases supervised by amnioscopy

Total N° of deaths (not malformed) : 21 (5.3%)

Total N° of deaths (inc. malformed) : 34 (8.6%)

No OF DEATHS (NOT MALFORMED)	
GROUP A (1989 CASES)	GROUP B (1987 CASES)
2 (1.0‰)	2 (1.0‰)
1 (0.5‰)	2 (1.0‰)
12 (6.0‰)	2 (1.0‰)
15 (7.5‰)	6 (3.0‰)

ANTE PARTUM
INTRA PARTUM
POST PARTUM

No OF DEATHS (NOT MALFORMED)	
STAINED A.F. (516 CASES)	CLEAR A.F. (3460 CASES)
3 (5.8‰)	1 (0.3‰)
2 (3.9‰)	1 (0.3‰)
3 (5.8‰)	11 (3.2‰)
8 (15.5‰)	13 (3.8‰)

S = 0.01 < p < 0.05

3⁰/₀₀). This drop was due to the reduction of neonatal mortality (6⁰/₀₀ in group A and 1⁰/₀₀ in group B).

Ante-partum mortality was rare in both groups (1⁰/₀₀).

If we subdivide our cases according to the characteristics of the amniotic fluid, perinatal mortality in cases with stained and/or sparse-absent A.F. (15.5⁰/₀₀) was higher than in cases with clear A.F. (3.8⁰/₀₀); it is peculiar that, excluding cases with stained A.F. at first amnioscopy, perinatal mortality was about the same both in patients with stained A.F. (3.9⁰/₀₀) and clear A.F.

Only one case of ante-partum fetal death occurred in clear A.F. pregnancies: in this patient, for still unknown causes, the amnioscopic test was not repeated after 48 hours, and fetal death was diagnosed after 72 hours.

In the three patients with ante-partum fetal death with stained A.F., labour was not induced in spite of a positive amnioscopic test.

In P.M. pregnancies (Tab. VII) perinatal mortality was 3.2⁰/₀₀ and we must underline that we had no cases of ante-partum fetal death.

In respect to diabetic patients (Tab. VIII), perinatal mortality not corrected was 0.6% in class A and 1.8% in classes B-F: That is 2.4% in all.

The only case of ante-partum fetal death, we have already reported in our series, was among the first patients controlled by amnioscopy.

From 1967 to 1975, 91 diabetic patients underwent childbirth without amnioscopic supervision: Including these cases, total perinatal mortality not corrected (439 diabetic pregnancies, 443 offsprings) was 2.9%, while corrected it was 2.3%.

3 Discussion

3.1 Importance of amnioscopy in intensive care of pregnancy at risk

Two main points emerge from this retrospective analysis. The first one concerns perinatal mortality, which is very limited (8.6⁰/₀₀ in groups A and B) especially if referred to a group of pregnancies at risk.

The second one is the reduction of perinatal mortality from group A (7.5⁰/₀₀) to group B (3.0⁰/₀₀) due to a fall in neonatal mortality (6⁰/₀₀ and 1⁰/₀₀ respectively in groups A and B).

This second result is specially worth noticing if we consider that the lower percentage of P.M. pregnancies in group B – in comparison to group A – has determined a change in the kind of pathology of group B patients with a higher perinatal risk.

In recent years a reduction in neonatal mortality was been reported in another retrospective analysis [2] and we can also accept the reasons given for this reduction: At the time we collected group B, we were able to monitor the clinical condition of

Tab. VII. Perinatal mortality in overterm cases (N° 2482) supervised by amnioscopy

	No OF DEATHS	
	NOT MALFORMED	MALFORMED
ANTE PARTUM	0	0
INTRA PARTUM	1	1
POST PARTUM	7	7
TOTAL	8 (3.2%)	8 (3.2%)

Tab. VIII. Pregnant diabetic women supervised by amnioscopy: Perinatal mortality

	No OF DEATHS	
	WHITE'S CLASSES	
	A	B → F
ANTE PARTUM	0	1 (F)
INTRA PARTUM	0	1 [⊙] (D)
POST PARTUM	1*	1 (E)
TOTAL	1 (0.6%)	3 (1.8%)

⊙ MALFORMED

* TWIN

the fetus ante-intra-partum with routine methods not available when we collected group A. We must also consider the improvement of intensive neonatal care.

As far as fetal death in pregnant women at high risk is concerned, we must emphasize that it is identical and very low in the two groups (1/100).

Other authors have already pointed out how routine use of amnioscopy reduced fetal ante-partum death to such a low level that it cannot be further modified [2].

Moreover the four cases of ante-partum fetal death could have been avoided by more skilful obstetrical care (this refers to the 3 cases with stained A.F.) and if amnioscopy had been repeated after 48 hours (the case with clear A.F. was tested after 72 hours).

In our series, positive tests associate with a higher incidence of C.S. (Tab. IV) and with a greater perinatal mortality rate. Yet the latter is reduced to similar rates as in clear A.F. tests when we exclude cases of perinatal death with stained A.F. since the first amnioscopy.

If this data is confirmed it would show that the major risk for fetuses with stained A.F. is a belated checking of meconium in A.F.

In addition to this, a clear A.F. in the first amnioscopic control would have favourable prognostic

significance, and the importance of amnioscopic supervision within 48 hours would be confirmed. These observations together with the following ones strengthen the importance of amnioscopic supervision for pregnancies at risk. This positive judgement includes the low costs of amnioscopic testing, a fact which makes it particularly attractive in comparison to other tests for fetal monitoring especially for the diagnosis of high risk pregnancies in underdeveloped countries.

3.2 Wrong diagnosis (false positive). Amnioscopy impracticable and accidental rupture of membranes

The restricted number of examiners and their experience has certainly contributed to the small number of these three events: five physicians in 8 years performed daily a large number of amnioscopies (on average 25 tests).

3.3 Incidence of cases with stained A.F.

The frequency of cases with stained A.F. reported in literature is quite different from center to center [3, 5, 8, 10]. This surely depends upon the different composition of the groups. In our trial, the incidence of stained and/or sparse-absent A.F. seems to be different in the various pathologies,

even though the different sizes of these groups do not allow us to draw ultimate conclusions (Tab. II).

3.4 Method of delivery

In our study as well as in those reported in literature [7, 10] the incidence of C.S. in patients with stained and/or sparse-absent A.F. was higher compared to those with clear A.F.

Hence the finding of stained and/or sparse-absent A.F. is associated with a higher risk of fetal hypoxia in labour. As for the higher frequency of C.S. in group A compared to group B, it should be remembered that group B could take advantage of routine use of FHR monitoring in our delivery room.

3.5 Postmaturity

In our experience one can reach "first class" results by the use of amnioscopic supervision of fetuses in P.M. pregnancies. **No cases of antepartum fetal death have occurred.** It should be underlined that the number of P.M. pregnant women is very high in our series and that labour was induced only when A.F. was evaluated stained and/or sparse-absent.

Another way to face the problem of delivery time in P.M. pregnancies is the induction of labour if the condition of mother and fetus guarantee a favorable outcome for both.

A comparison between these two obstetric methods, one "non active" the other "active", could be made if we had at our disposal a case study that was both homogeneous and as large as ours and followed according to the "active" criteria.

Apart from other considerations, difficulties are met when applying these criteria in those wards which, like ours, still have an elevated number of births and a particular incidence of pathology: In these circumstances amnioscopy represents a very reliable method of controlling fetal conditions.

Opinions vary as regards to the time of beginning amnioscopic tests; this reflects the different opinions in judging the day of amenorrhea beyond which pregnancy becomes postmature.

In our trial the frequency of stained and/or sparse-absent A.F. is high from the 280th day of amenorrhea.

Therefore it is evident, as we had already reported [5], and thereafter confirmed [10], that amnioscopic control should begin immediately after this date.

3.6 Pregnant diabetics

In our series of diabetic pregnancies we did not adopt the criteria of systematic interruption of pregnancy, as is generally used in these cases. We have induced labour only when the A.F. test was positive (the only exception is the case in which pregnancy was interrupted at the 35th week for impaired renal function. This has evidently contributed to the results concerning the time and method of birth (a total of 78% gave birth after the 38th week and 17% after the 40th: 68% were delivered spontaneously). We must stress the fact that no ante-partum fetal death occurred with clear A.F., an event reported in other series, a fact which led some to discuss the opportunity of amnioscopic monitoring in diabetic patients. It should be emphasized that if the reason for the delay in delivery is unknown, the reason of the typical, sudden death of the fetus in the pregnant diabetics during the last month of pregnancy is also unknown.

According to some [9], the cause of death may be a profound and fatal metabolic disorder developed in the fetus as a consequence of a similar one in the mother (hypoglycemia or hyperglycemia). **On the basis of our results the use of amnioscopy seems to be advisable in the ante partum fetal control also in pregnant diabetics, but it depends on their having undergone a strict metabolic control.**

4 Conclusions

1) Amnioscopy is a simple low cost method, efficient in the supervision of the high risk patient, that is in the selection of cases with a high fetal hypoxia risk.

The results of our retrospective analysis demonstrate that perinatal mortality in cases controlled by amnioscopy is highly contained and satisfactory (8.6‰) considering the type of pathology: ante-partum mortality in our series has been 1.0‰.

2) In the overterm patient, amnioscopic control is capable of guaranteeing a "first-class result": There have been no cases of ante-partum fetal death in our case studies.

The presence of cases with stained amniotic fluid in the first 5 postmature days (Fig. 3) indicates the necessity to begin amnioscopic

control immediately after the 280th day of amenorrhea.

3) When the diabetic patient has been strictly compensated in pregnancy amnioscopy can still be used as it probably maintains its prerogative (that is, the supervision of the fetus).

Summary

Since 1967 amnioscopic control has been daily routine in our Clinic.

The number of pregnancies at risk controlled by amnioscopy from 1967 to 1975 is about 19,000. This large number of cases has offered us the chance to reflect again on the values of this test in the selection of patients presenting risks for fetal hypoxia.

A retrospective analysis of 4000 cases was carried out: 2000 controlled from 1. 1. 1968 to 30. 8. 1969 and 2000 from 4. 6. 1974 to 24. 3. 1975.

In addition to this 348 diabetic patients supervised by amnioscopy from 1967 to 1975, were examined; in these patients metabolic control was quite strict and was obtained adopting the criterium of insulin administration to each individual point of tolerance (P.H.I.T.) [6].

The amnioscopic tests were repeated on alternate days using instruments and methods proposed by SALING [11].

As regards P.M. pregnancies, amnioscopic control began from the 280th day of amenorrhea.

There were 13 (0.3%) false positive cases (stained A.F. not confirmed by amniorexis), amnioscopy was not feasible in 18 cases (0.4%). Such small percentages can be explained by the fact that only 5 colleagues worked in the amnioscopy out-patients department from 1967 to 1975.

The incidence of stained and/or sparse-absent A.F. was in all 13% both in group A and group B: it was different in the various pathologies which compose each group.

The frequency of stained and/or sparse-absent A.F. in diabetic patients was 12.6%. Labour was induced when the amnioscopic tests were positive (stained and/or sparse-absent A. F.) as according to the higher risk for the fetus as diagnosed by means of other tests. In P.M. and diabetic pregnant women the decision to induce labour was taken only on the basis of amnioscopy.

No case of ante-partum fetal death occurred in pregnant women with a clear A.F. (Part 2.6).

A higher incidence of C.S. (Tab. IV) and a greater perinatal mortality rate was observed in cases with stained and/

or scarce-absent A.F. in comparison to those with clear A.F. It is probable that this increase of perinatal risk is associated with the belated finding of meconium in the A.F. in respect to the cause which determined its emission (Part 3.1.).

The perinatal mortality not corrected (including cases of foeto neonatal weight of ≤ 1000 grs) of group A is 7.5‰ and that of group B is 3‰. This fall is due to the reduction of the neonatal mortality rate (6‰ in group A and 1‰ in group B) (Tab. VI).

In P.M. pregnancies perinatal mortality was 3.2‰ (Tab. VII). No case of ante-partum fetal death occurred. Perinatal mortality not corrected in pregnant diabetics was 0.6% in class A and 1.8% in patients of classes B-F (Tab. VIII).

These results confirm those of a recent trial [2] where the importance of amnioscopy in reducing ante-partum fetal death rate was assessed; this reduction is so remarkable that it cannot be further modified; in our series ante-partum mortality rate of group A (1968-1969) is very limited (1‰) and similar to that of group B (1974-75).

As regards P.M. pregnancies the amnioscopic test represents a method which can guarantee by itself a reliable control of fetal condition.

In these pregnancies as we have already indicated [5] amnioscopic control should be initiated after the 280th day of amenorrhea: because the percentage of stained A.F. is high from the first 5 overterm days (Fig. 3).

Furthermore, our results reconfirm the value of amnioscopy in the supervision of the fetus in pregnant diabetic women: we remember that labour had never been induced except on the basis of stained A.F. (excluding the two exceptional cases reported above).

The reduction to 20% of C.S. in our series is surely to be attributed to the "non active" obstetric conduct.

It is probable that a strict metabolic control of maternal diabetes represents a "sine qua non" condition for amnioscopy to maintain its prerogatives also in diabetic pregnant women.

Keywords: Amnioscopy, amniotic fluid, ante-partum mortality, diabetes in pregnancy, perinatal mortality, stained amniotic fluid.

Zusammenfassung

Über die Bedeutung der Amnioskopie für die Überwachung einer Risikoschwangerschaft: Eine retrospektive Analyse von 4277 Fällen.

Seit 1967 gehört die amnioskopische Fruchtwasserkontrolle zu den täglichen Routineuntersuchungen in unserer Klinik. Die Anzahl der Risikoschwangerschaften, die in

dem Zeitraum von 1967–1975 durch Amnioskopie kontrolliert wurden, beläuft sich ungefähr auf 19000. Diese große Fallzahl bietet uns die Möglichkeit, erneut über die Wertigkeit dieser Untersuchung bei der Selektion von Patientinnen mit möglichem, fetalem Hypoxierisiko nachzudenken. Wir haben eine retrospektive Studie anhand von 4000 Fällen durchgeführt: 2000 Patientinnen wurden vom 1. 1. 1968 bis zum 30. 8. 1969 (Gruppe A) und weitere 2000 vom 4. 6. 1974 bis zum 24. 3. 1975 (Gruppe B) kontrolliert. Zusätzlich wurden 348 Schwangere mit Diabetes mellitus untersucht, die von 1967 bis 1975 amnioskopisch überwacht worden waren. Bei diesen Patientinnen war die Stoffwechselkontrolle ziemlich straff, was dadurch erreicht wurde, daß die Insulingabe nach dem Gesichtspunkt der persönlich noch tolerierten Maximaldosis (P.H.I.T.) [6] gesteuert wurde.

Die Amnioskopie wurde jeden zweiten Tag wiederholt, wobei wir das Instrumentarium und die Methodik von SALING [11] verwendeten. Hinsichtlich der *Terminschwangerschaften* begann die amnioskopische Kontrolle ab dem 280. Tag der Amenorrhoe. Falsch positive Ergebnisse (mekoniumhaltiges Fruchtwasser, das nach Blasenprung nicht bestätigt wurde) fanden sich in 13 (0.3%), eine Amnioskopie war nicht durchführbar in 18 Fällen (0.4%). Diese kleinen Prozentsätze können durch die Tatsache erklärt werden, daß nur 5 Kollegen die Amnioskopie im Zeitraum zwischen 1967 und 1975 in der Ambulanz durchgeführt haben.

Die Häufigkeit von mekoniumhaltigem und/oder reduziertem bis fehlendem Fruchtwassergehalt betrug sowohl in Gruppe A wie Gruppe B 13%. Der Prozentsatz ist unterschiedlich bei den verschiedenen pathologischen Zuständen, aus welchen jede der beiden Gruppen zusammengesetzt war. Die Häufigkeit von verfärbtem und/oder reduziertem bis fehlendem Fruchtwasser betrug bei den Diabetika 12,6%. Die Geburt wurde eingeleitet, wenn die Amnioskopie positiv war (mekoniumhaltige und/oder reduzierte bis fehlende Fruchtwassermenge) entsprechen dem höheren fetalen Risiko, das auch durch andere Untersuchungen diagnostiziert worden war. Bei den Terminschwangerschaften und den diabetischen Schwangeren wurde die Entscheidung, die Geburt einzuleiten nur auf Grund der Amnioskopie gefällt. Bei den Frauen mit klarem Fruchtwasser war kein antepartaler, fetaler Todesfall zu beklagen. Bei den Fällen mit mekoniumhaltigem Fruchtwasser und/oder reduziertem bis

fehlendem Fruchtwassergehalt fanden sich im Vergleich zu jenen mit klarem Fruchtwasser eine höhere Kaiserschnittfrequenz und eine höhere perinatale Mortalität. Wahrscheinlich geht diese Zunahme des perinatalen Risikos mit dem später zu beobachtenden Befund von Mekonium im Fruchtwasser einher und steht mit der Ursache des Mekoniumalganges in Zusammenhang (Teil 3.1.). Die ungereinigte perinatale Mortalität (einschließlich der Fälle mit fetoneonatalem Gewicht von ≤ 1000 g) in Gruppe A betrug $7,5\%$ und jenen Gruppe B 3% ; dieser Abfall ist auf die Reduktion der neonatalen Mortalitätsrate (6% in Gruppe A und 1% in Gruppe B) (Tab. VI) zurückzuführen. Bei den *Terminschwangerschaften* betrug die perinatale Mortalität $3,2\%$ (Tab. VII). Wir konnten keinen antepartalen, fetalen Todesfall beobachten. Die ungereinigte Mortalität bei den schwangeren Diabetika betrug 0.6% bei Klasse A und 1.8% bei den Klassen B–F (Tab. VIII). Diese Ergebnisse unterstützen jene einer kürzlich erschienenen Studie [2], in der auf die Bedeutung der Amnioskopie für den Rückgang der antepartalen, fetalen Todesfälle hingewiesen wurde. Diese Reduktion ist so deutlich, daß sie nicht weiter verbessert werden kann; in unseren Serien betrug antepartale Mortalitätsrate in Gruppe A (1968–1969) auf 1% und somit ähnlich hoch wie in Gruppe B (1974–1975). Was die *Terminschwangerschaften* anbelangt, stellt die Amnioskopie eine Methode dar, die eine verlässliche Kontrolle des fetalen Zustandes zu garantieren vermag. Wie wir schon gezeigt haben [5], sollte die amnioskopische Kontrolle bei diesen Schwangerschaften nach dem 280. Tag der Amenorrhoe begonnen werden, da der Prozentsatz an mekoniumhaltigem Fruchtwasser während der ersten fünf Tage nach dem Termin (Fig. 3) hoch ist.

Darüber hinaus sprechen auch unsere Resultate für die Bedeutung der Amnioskopie auch bei der Überwachung des Feten bei Schwangeren mit Diabetes mellitus: Wir möchten daran erinnern, daß die Wehen nur auf der Basis von mekoniumhaltigem Fruchtwasser induziert wurden (ausgenommen 2 besprochene Fälle. Die Senkung von Sectiofrequenz auf 20% in unserem Material ist sicher auf unsere nicht aktive geburtshilfliche Einstellung zurückzuführen. Wahrscheinlich stellt eine straffe mütterliche Stoffwechselkontrolle bei der Diabetika eine *conditio sine qua non* dar, damit die Amnioskopie auch bei der diabetischen Schwangeren ihre P-Zuverlässigkeit?) behalten kann.

Schlüsselwörter: Amnioskopie, antepartale Mortalität, Diabetes in der Schwangerschaft, Fruchtwasser, mekoniumhaltiges Fruchtwasser, perinatale Mortalität, Übertragung.

Résumé

Importance de l'amnioscopie dans la surveillance des grossesses «à risque»: Analyse rétrospective de 4 277 cas Depuis 1967 l'examen du liquide amniotique est devenu de pratique courante dans notre service.

Le nombre des grossesses «à risque» contrôlées par amnioscopie s'est chiffré à 19 000 environ entre 1967 et 1975, ce qui nous a permis d'analyser la valeur de ce test chez les parturientes présentant un danger d'hypoxie fœtale.

Nous avons effectué à cet effet une analyse rétrospective de 4 000 cas: 2 000 contrôlés entre le 1. 1. 1968 et le 30. 8. 1969 et 2 000 autres entre le 4. 6. 1974 et le 24. 3. 1975.

De plus, nous avons analysé les cas de 348 diabétiques ayant subi des examens amnioscopiques entre 1967 et 1975; chez ces parturientes, le contrôle du métabolisme avait été suivi avec la plus grande rigueur en appliquant le critère d'administration d'insuline à chaque point de tolérance individuel (P.H.I.T.) [6].

Des analyses amnioscopiques avaient été répétées à jours alternés selon les méthodes et instruments de SALING [11].

En ce qui concerne les grossesses après terme, le contrôle amnioscopique avait commencé dès le 280ème jour d'aménorrhée.

Le nombre des cas positifs faux (liquide amniotique coloré non confirmé par la rupture des membranes) s'est chiffré à 13 (0,3%), l'amnioscopie n'a pas été possible dans 18 cas (0,4%). Ces pourcentages réduits s'expliquent du fait que de 1967 à 1975, cinq confrères seulement étaient affectés au service de consultations pour amnioscopie.

L'incidence du liquide amniotique coloré et/ou «scarse-absent» totalise 13% aussi bien dans le groupe A que B, mais elle diffère à l'intérieur de chacun de ces groupes selon leurs diverses pathologies.

C'est ainsi qu'on a pu constater que la fréquence du liquide amniotique coloré et/ou «scarse-absent» atteint 12,6% chez les diabétiques. Le travail avait été déclenché dans les cas d'amnioscopie positive (liquide amniotique coloré et/ou «scarse-absent») en raison du risque accru encouru par le fœtus et du diagnostic confirmé par d'autres tests. Dans les cas de grossesses après terme ou avec diabète, l'induction du travail avait été décidée à la suite seulement des résultats de l'amnioscopie.

Aucun cas de mort foetale ante partum n'a été enregistré chez les femmes enceintes ayant fait état d'un liquide amniotique clair à l'examen (2.6).

Par contre, nous avons observé une incidence plus élevée de C.S. (Tab. IV) et un taux de mortalité périnatale plus important dans les cas de liquide amniotique coloré et/ou «scarse absent» que dans ceux de liquide amniotique clair. Il est probable que cet accroissement du risque périnatal est associé à l'observation tardive de méconium dans le liquide amniotique, compte tenu de la cause qui en a déterminé l'émission (part 3.1).

La mortalité périnatale non corrigée (à l'inclusion des cas de poids foetal néonatal de $\leq 1\ 000$ g est de $7,5\%$ pour

le groupe A et de 3% pour le groupe B, cette baisse étant due à la diminution du taux de mortalité néonatale (6% dans le groupe A et 1% dans le groupe B) (Tab. VI).

Dans les grossesses après terme, la mortalité périnatale a été de $3,2\%$ (Tab. VII). Aucun cas de mort foetale ante partum n'a été relevé. La mortalité périnatale non corrigée chez les femmes enceintes diabétiques s'est élevée à $0,6\%$ dans la Classe A et à $1,8\%$ dans les Classes B-F (Tab. VIII).

Ces résultats confirment ceux d'un test récent [2] destiné à évaluer l'importance de l'amnioscopie pour faire baisser le taux de mort foetale ante partum; cette baisse est si forte qu'il n'est pas possible de la renforcer encore; en ce qui concerne les sujets de nos analyses, le taux de mortalité ante partum du groupe A (1968-1969) est très limité (1%) et similaire à celui du groupe B (1974-1975).

Quant aux grossesses après terme, l'amnioscopie constitue une méthode sûre de contrôle de l'état du fœtus. Dans ces grossesses, comme nous l'avons déjà indiqué [5], l'examen amnioscopique devrait commencer après le 280ème jour d'aménorrhée, le pourcentage de liquide amniotique coloré étant élevé à partir des cinq premiers jours après terme (Fig. 3).

Par ailleurs, nos résultats confirment le recours à l'amnioscopie pour surveiller le fœtus chez les femmes enceintes diabétiques et nous rappelons à cet égard que nous avons décidé de déclencher le travail à la seule considération du liquide amniotique coloré (à l'exception des deux cas exceptionnels reportés ci-dessus).

La diminution jusqu'à 20% du C.S. chez nos sujets est due sans aucun doute à la conduite obstétrique «non active».

Il est probable qu'un contrôle métabolique rigoureux du diabète maternel constitue une condition «sine qua non» pour pouvoir mener à bien l'amnioscopie même chez les femmes enceintes diabétiques.

Mots-clés: Amnioscopie, diabète en cours de grossesse, grossesse après terme, liquide amniotique, liquide amniotique coloré, mortalité ante partum, mortalité périnatale.

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Bibliography

- [1] BEARD, R. W., J. M. BRUNDENELL: Fetal monitoring in diabetic pregnancy. In: CAMERINI-DAVALOS R. A., H. S. COLE: Early Diabetes in Early Life, Academic Press, New York - San Francisco - London, 1975
- [2] BOLLINGER, J., E. HOCHULI, J. EBERHARD, A. SCHURZ: Hat die Amnioskopie heute noch ihre Berechtigung? Fortschr. Med. 90 (1972) 937
- [3] BOWE, E. T.: Amnioscopy. Clin. Obstet. Gynecol. 12 (1969) 527
- [4] BOWE, E. T.: Amnioscopy and Fetal Scalp Blood Sampling. In: SPELLACY W. N.: Management of the high-risk pregnancy, University Park Press, Baltimore - London-Tokyo, 1975
- [5] FUJIKURA, T., B. KLIONSKY: The significance of meconium staining. Am. J. Obstet. Gynec. 121 (1975) 45
- [6] HOCHULI, E., J. EBERHARD, O. DUBLER: The effect of modern intensive monitoring in obstetrics on infant mortality and the incidence of hypoxia and acidosis. J. Perinat. Med. 4 (1976) 78
- [7] ROVERSI, G. D., V. CANUSSIO, F. GORINI, F. JURARO, G. TRONCONI: Die Amnioskopie in der Frühdiagnose der Fetalen Hypoxie: Anwendung und Auswertung der Methode (1000 Fälle). Geburtsh. u. Frauenheilk. 11 (1969) 1005
- [8] ROVERSI, G. D., V. CANUSSIO, M. GARGIULO, G. B. CANDIANI: The intensive care of perinatal

- risk in pregnant diabetics (136 cases); A new therapeutic scheme for the best control of maternal disease. *J. Perinat. Med.* 1 (1973) 114
- [9] SALING, E.: Die Amnioskopie, ein neues Verfahren zum Erkennen von Gefahrenzuständen des Feten bei noch stehender Fruchtblase. *Geburtsh. u. Frauenheilk.* 22 (1962) 830
- [10] SALING, E.: Lecture held at the Gesellschaft für Geburtshilfe und Gynäkologie, Berlin. Ref.: *Zbl. Gynäk.* 85 (1963) 108
- [11] SALING, E.: Amnioscopia: Premesse fisiopatologiche, tecnica e applicazione clinica. In: CANDIANI, G. B., G. D. ROVERSI: *Atti 1e Corso Nazionale di Aggiornamento in Medicina Perinatale.* Minerva Medica, 1973
- [12] WHO: *Techn. Rep. Ser. n. 457*, 19
- [13] ZENNER, I., H. NÖSCHEL, D. STECH, H. HOPPE, P. STECH: Korrelation von antenatalem Kardiotokogramm und Amnioskopie bei der Überwachung von Schwangeren nach Überschreitung des errechneten Geburtstermins. *Zbl. Gynäk.* 97 (1975) 583
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