EARLY LEGAL ABORTION AND Rh ISOIMMUNIZATION

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SUMMARY

The Author has conducted a survey on the awareness of the blood group of the ABO system and of the Rh (D) factor in a group of 1815 female university students of whom 79.94% were sexually active, with particular attention to 6.47% who reported one or more legal abortions. Among the latter, the group with Rh negative underwent a test for identification of irregular antierythrocytic antibodies.

Around 60% of the students knew their blood group and Rh factor (positive in 83% of the cases). The students who underwent a legal abortion did not know their blood group in 17% of the cases, were Rh positive in 66% of the cases and Rh negative in 17% of the cases (only one underwent the anti-D prophylaxis): some of the latter group were investigated for antibodies but none were detected.

It is hoped that the young population, particularly the sexually active one, will become aware of the Rh problem because only through adequate information it will be possible to obtain real preventive medical care, eliminating anti-D haemolytic disease of the newborn.

* Abortion was legalized in Italy on 22 May 1978.

Isoimmunization versus the Rh factor (D), pathogenetic basis of the haemolytic disease of the newborn, is due to a foeto-maternal transfusion that can occur during pregnancy and more frequently at birth: red foetal cells carriers of the D antigen passed in the maternal circulation (Rh negative) stimulate the immuno-competent cells to the formation of specific antibodies.

Its frequency varies considerably because the antibodies reaction depends on several factors: the incidence of blood antigens of the population, the amount and the frequency of the antigenic stimulation, the antigen power and the individual reactive capacity and the natural maternal agglutinin which destroy rapidly the erythrocytes of the Rh positive ABO incompatible foetus ([14, 19]).

From these data it can be deduced that the medical problem is also of great social interest because of the large percentage of the population which may be affected; in fact, the incidence of union between Rh positive men and Rh negative women is 12.75% ([11]).

Isoimmunization can occur also with a small quantity of blood, about 0.1 ml transfused from the foetus to the mother after 38th-40th day of foetal development, the time when the Rh antigen appears ([18]). This explains its appearance after an abortion or during a pregnancy that reaches term. However it is during delivery, mainly during expulsion of the placenta, that passage of foetal blood to the mother can occur: this has been demonstrated in 6 to 40% of the cases ([5, 16]).

Three to six months elapse between foeto-maternal transfusion and immunological response, and it is after that period that the antibody titre must be evaluated.

In any case, the majority of Rh negative women do not become immune during the first pregnancy nor after the following ones, even if the risk increases with the number of pregnancies (after four pregnancies the cumulative risk of immunization

reaches about 33%), so that haemolytic disease of the newborn affects only a part of the Rh positive foetuses [6].

In the last decade the approach to the Rh problem has changed from permanent surveillance of the foetus in uterus and transfusion, to the prophylaxis of Rh negative mothers who have aborted or delivered a Rh positive foetus.

Prophylaxis consists of the administration within 72 hours from delivery of a standard dose of anti-D (IgG) immunoglobulins because the foeto-maternal haemorrhage, that occurs during delivery, rarely exceeds 10 ml, and more severe ones are rare [1]. This procedure has lowered the percentage of immunized women (0.21%) in comparison with non treated women (5.2%). In spite of the treatment, the percentage of immunized women has increased (+1.3%) in subsequent pregnancies with Rh positive foetus, but the increase has been higher (+11.5%) in non treated women [17].

The low percentage of failure may have different origins, but the most important one is the high incidence of previous abortive pregnancies. In fact, it has been calculated that foeto-maternal haemorrhage after abortion occurs in 6-28% of the cases [7] and that the incidence of immunization varies with the period of abortion, close to 0% at four weeks, 1% at six to eight weeks, 3% within the twelfth week, 4% after the twelfth week [6], 5-9% if is an induced abortion [9, 10]. Although immunization risk is undoubtedly less in spontaneous abortions than in term deliveries, Rh immunoprophylaxis should still be performed, in particular when intrauterine manipulations may increase foeto-maternal transfusion [15].

Prophylaxis after at term delivery is easily practicable while various difficulties arise after an early spontaneous abortion and even more after illegal abortions: lack of knowledge of the blood group and of the Rh factor, lack of antibody titration, uncertainty of pregnancy in women with irregular periods and no histologic data or hormonal titres, the short period of hospitalization are factors that prevent, in many cases not treated, an opportune administration of immunoglobulins.

In Germany, in 1972 prophylaxis was carried out in 86% of Rh negative puerperae, in 26% of spontaneous abortions and in 8.9% of induced abortions [13]; simultaneously an anti-D immunization was found in 3-4% of spontaneous abortions and in 5.5% of induced abortions [12]. The use of prophylaxis in cases of abortion is very low.

Since our previous investigation [2] showed that 6.47% of 1815 female students had undergone one or more legal abortions, the present study was undertaken.

MATERIAL AND METHODS

During the period October 1976-April 1979, 1815 female students, most of them between 18 and 23 years old and born in Milan or in its province, underwent a gynecological examination at the Centre of Preventive Medicine of the University of Milan [3, 4].

6.47% (94) out of 79.94% (1451) who reported premarital intercourse had one or more legal abortions within the twelfth week of gestation.

All of them were asked for their blood group and Rh factor; those who had had a legal abortion were asked if they had had anti-D prophylaxis.

Moreover, all the students studied between October 1978 and April 1979 who did not know their Rh factor or blood group and those who were Rh negative and had had a legal abortion, were investigated for irregular anterythrocytic antibodies, in saline phase, albuminoidal medium, indirect Coombs test and in enzymatic phase. At the beginning it was considered that a discussion of the Rh problem would be sufficient to rouse interest in the students, but since this did not prove the case it was decided to proceed directly with the investigation.

RESULTS

Table 1 reports the series subdivided according to university faculty, indicating the number and percentage of students, the knowledge or ignorance of blood

Table 1.

Faculty	Students No.	%	Did report group Rh %	Did not report group Rh %
Medicine	470	25.89	65	35
Literature	275	15.15	57	43
Philosophy	180	9.91	61	39
Languages	155	8.53	53	47
Law	153	8.42	56	44
Biology	124	6.83	60	40
Pharmacy	103	5.67	61	39
Mathematics	89	4.90	61	39
Political Sc.	55	3.03	56	44
Agriculture	52	2.86	58	42
Alimentology	47	2.58	61	39
Physics	43	2.36	53	47
Veterinary med.	38	2.09	74	26
Others	31	1.70	72	28

group and Rh factor. The largest group belonged to the school of medicine, 65% of whom knew their blood group and Rh factor, thus showing a greater interest in this problem than the average of the groups which was 58.41%, ranging from 53% of the physics students to 74% of veterinary students.

Table 2 reports the series subdivided by academic year and shows no important variations in the percentages during the three academic years of the survey (57.91% for the academic year 1976/77, to 58.68% for 1977/78, and 58.64% for 1978/79) while the Rh factor was positive in 83% of the cases and negative in 17%, the latter being higher than that of the average population. Another subdivision, not reported in the table, based on the students' sexual activity, has indicated that those who reported sexual activity had a better knowledge of their blood group and Rh factor.

Table 2.

Academic year	Students No.	Did report group Rh %	Did not report group Rh %	Rh+ %	R— %
1976/77	644	57.91	42.09	82	18
1977/78	714	58.68	41.32	83	17
1978/79	457	58.64	41.36	84	16
	1815	58.41	41.59	83	17

Table 3.

Students	879		181
Rh	pos.	%	neg.
Group O	43.34		48.06
A	39.36		37.56
B	11.94		10.49
AB	5.34		3.86

Table 3 illustrates the distribution (1060 students) of the groups in the ABO system subdivided in 879 Rh positive and 181 Rh negative. A summarized analysis of the data does not reveal any substantial difference between these percentages and the ones observed in the control group ([8]).

Table 4 reports the analysis of the distribution, according to the groups of the ABO system, Rh positive (62 cases) and Rh negative (16 cases), of the 94 students who underwent one or more legal abortion; 16 did not know their blood group or Rh factor.

Table 5 lists, for each academic year, the students who had a legal abortion, those who were Rh negative and those who did not supply information on their blood group or Rh factor. The group includes: 80 (85.10%) students who underwent a legal abortion, 11 (11.71%) who had had two legal abortions and 3

Table 4. — *Abortions subdivided according to blood group.*

Rh	Positive	%	Negative
0	58.06		50
A	32.25		37.5
B	8.06		12.5
AB	1.61		

Table 5.

Academic year	Legal abortions	Rh neg.	Rh factor unknown
1976/77	26	5	7
1977/78	40	5 *	7
1978/79	28	6	2

* One student underwent prophylaxis.

(3.19%) who had had three legal abortions.

Only one student underwent an anti-D immunoprophylaxis during the academic year 1977/78.

Table 6 reports the series of Rh negative students of the academic year 1978/79, who were investigated for irregular anti-erythrocytic antibodies with negative results.

Out of the sixteen students with Rh negative factor, only one had received the anti-D immunoprophylaxis. To these a small percentage of Rh negative students, probably included in the fraction ([16]) of students who did not know their blood group or Rh factor, must be added.

CONCLUSIONS

In our country, there is a growing interest in preventive medicine, which tries in different ways to protect the individual from disease and to keep the individual healthy by educating him appropriately.

Neonatal haemolytic disease is the type of pathology that fulfills this modern concept of medicine and which can be eliminated by making immunization available to Rh negative women so that eventually neonatal haemolytic disease will disappear.

In USA (1972) it has been calculated that the request for abortion has outrun the number of one million per year; most of them are young women without children, 10-15% have a Rh negative factor, and of these 5-10% are exposed to the risk of immunization if not adequately protected ([10]). Nowadays because abortion has been legalized in many countries, the demand for legal abortion has increased dramatically and women with Rh negative factor must be subjected to particular surveillance, in order to ensure they are treated so that immunization does not ensue.

In fact the risk of immunization in the case of abortion exists, and varies considerably with gestational age; the anti-D prophylaxis is necessary in women with Rh negative factor without antibodies after spontaneous abortion, and is much more necessary in the case of induced abortion, as after delivery of a Rh positive foetus. The same treatment must be carried out in cases of ectopic pregnancy, of haemorrhage due to placenta disruption during pregnancy and in those subjected to amniocentesis. The same treatment must also be given to women who receive

Table 6.

Name	Age	Group	Abortions	Age 1st intercourse	Investigation on anti-D antibodies					
					Physiol.		Coombs	Albumin	Enzyme	
					22°C	37°C	37°C	37°C	22°C	37°C
C. A.	21	B−	1	19	—	—	—	—	—	—
C. A.	29	O−	3	18	—	—	—	—	—	—
C. R.	35	O−	1	22	—	—	—	—	—	—
T. J.	23	A−	2	17	—	—	—	—	—	—
C. M.	21	A−	1	18	—	—	—	—	—	—
B. S.	26	O−	1	20	—	—	—	—	—	—

transfusions not only of incompatible blood but also of blood components, e.g. platelets and cryoprecipitates which may be contamined with erythocytes ([6]).

In doubtful cases prophylaxis is always preferable: it can be useful and is not harmful; 9% of all pregnancies and 14% of all abortions observed in a medium sized hospital should receive this type of management ([6]).

In abortions before the twelfth week of gestation, because of the small amounts of foetal blood that reach the maternal circulation, prophylaxis at a lower dose (75 mg) of IgG confers adequate protection at a lower cost.

The results of this study have shown some of the most important points of the problem; first: it is important and necessary to know the blood group and Rh factor before beginning sexual activity, and to realize a contraceptive method should be used because most undesirable pregnancies seem to occur at the beginning of sexual life ([2]). Second: immunoprophylaxis is necessary, according to the reported methods, once a pregnancy interruption is decided.

Many of the students showed they did not have a clear picture of the problem, in particular the Rh negative ones, since only one of them took anti-D immunoglobulin after a legal abortion.

We all hope the student population will become more aware of the Rh isoimmunization, through definite information when contraceptive methods are discussed that explains, using simple and clear concepts, how to deal with such a problem and above all that points out the non reversibility of the immunological response, because once specific antibodies are produced, conditioned by D antigen, they cannot be destroyed or eliminated. Moreover, effective passive immunization has a limited action lasting only six months because the IgG half-life is 21-28 days and consequently the Rh negative woman needs new protection in the case of another pregnancy.

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