A Comparative Study of Eldoncards for Blood Grouping ABO and RHo (D) with the Tile Method of Typing

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Introduction

ELDONCARDS measure 10.5 cm by 7.5 cm. Each card contains a test portion covered with a cellulose film, upon which specific serum reagents have dried. These have been used in Denmark for 20 years.

Three kinds of cards are produced: white cards for ABO-D blood grouping; black cards for CDE testing and white cards for compatibility tests. This series studies the ABO-D grouping cards.

The card (Fig. I) contains 3 test panels and one control panel. Reagents are deposited on the cards by means of a special dispensing machine. In any series, 7,000 – 20,000 cards are produced and marked. The potencies of the anti-A, anti-B and anti-D sera used surpass the minimum requirements of the N.I.H., U.S.A. Random samples are then taken from each series and their efficacy is tested by means of known blood cells. Furthermore, before distribution, 50 cards are used and found faultless in the blood bank of the Copenhagen County Hospital in Gentofte.

Each card is hermetically sealed in metallic foil. This guarantees the stability of the card for a minimum of two years, provided they are stored below 22°C (70°F).

Materials and Method

The Clinic carried out 303 blood grouping for a comparative study between the Eldoncard method and the tiles method. A 50 percent washed cell suspension in 0.9 percent saline was used. These tests are all carried out by the authors and a trainee technician with no previous experience of laboratory work.

Blood collection

Samples of blood are collected from antenatal patients without any form of selection. About 2 ml of venous blood is collected in a dry syringe and allowed to clot in a plain container. The sample is tested by both method at the same time, usually within 36 hours of collection.

Laboratory technique for Eldoncards:

1. A portion of the serum with some loose cells is pipetted off to a small test tube and centrifuged at about 2000 r.p.m. for 2 minutes.

2. The clear serum is pipetted off to another clean test tube for storage in the freezer for future use if necessity requires a cross-matching or rechecking of the patients' blood group.

3. The deposited blood cells are washed with normal saline for three times and finally resuspended in a concentration of about 50 percent in saline.

4. The dried sera on the Eldoncard is reconstituted by the addition of a drop of fresh tap water to each panel.

5. A drop of the above cell suspension is dropped onto each of the four Eldoncard panels and also the tile grouping sera respectively. Eldoncard supplies a plastic comb for its mixing to be used only once and discarded. (Fig. I)

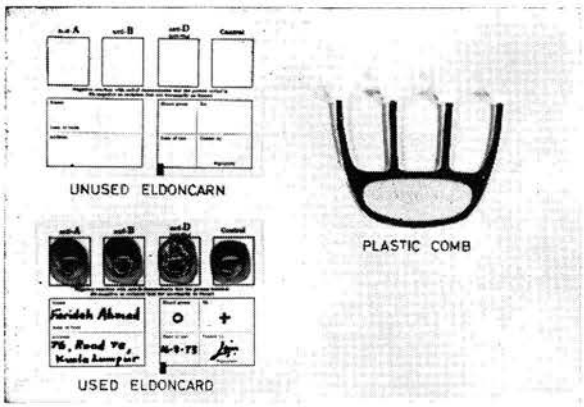

Fig. I
Eldoncard with Plastic Comb

6. After mixing for 30 seconds, wait for a minute and then agitate the card gently for a minute or so and note its reaction.

7. Report accordingly as shown in the diagram (Fig. 2). The tile method is done simultaneously and its agglutination checked with the Eldoncard.

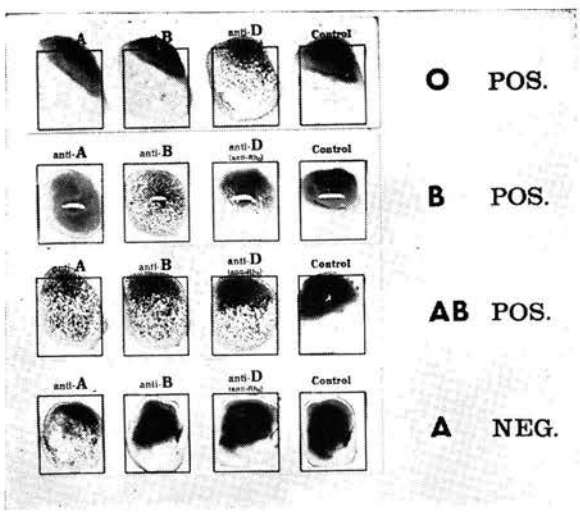

Fig. 2
Eldon Cards Blood Groupings

N.B.: A quality control of washed known cells is used for checking the grouping sera used for the tile method test. Therefore its accuracy is dependable.

Caution

Cord blood and blood having irregular antibodies, non-specific cold agglutinins, rouleaux formation, haemolysis, or absence of the regular antibodies are not recommended for use by this Eldoncard method. In severe anaemia cases the panels showing agglutination will be pale and small, hence the washed cell suspension method as described above is recommended instead of the prick method of obtaining blood.

Results:

The results are shown in the Table I.

Table I

Blood Group	Eldoncards method	Tile Method
A Pos.	92 samples	92 samples
B Pos.	69 samples	69 samples
O Pos.	124 ,,	124 ,,
AB Pos.	15 ,,	15 ,,
A Neg.	2 ,,	2 ,,
B Neg.	1 ,,	1 ,,
TOTAL	303 ,,	303 ,,

Comparative results of 303 blood samples showing ABO-D groupings.

Discussion:

Eldoncards are made for blood grouping using whole blood obtained by finger or ear-lobe prick. This study uses a 50 percent washed cell suspension. In 303 blood samples tested there was total agreement between the results: Eldoncards method and the tile method using Ortho Diagnostics antisera. In only one test was there any difficulty in reading the results of the Eldoncards – this was the anti-D panel.

The provision of a negative control panel is useful as any agglutination means the entire Eldoncard is not to be relied on. Agglutination may result from auto-antibodies in certain forms of hemolytic anaemia; in maternal antibodies in erythroblastosis foetalis and in bacterial transformation of the cells. In any blood sample which shows agglutination in the control panel, a direct Coombs test is indicated.

The advantages of using the Eldoncards are many. In a small hospital where the laboratory facilities are limited and where blood grouping is not frequently done, Eldoncards has a longer storage life and less wastage as they come in boxes of 5 cards when compared with antisera for the tile method. There is no fear of contamination or inactivation of test sera.

One Eldoncard costs M$1.50 and the antisera for grouping costs about M$0.35 for grouping one sample.

Eldoncard also provides a set of permanent records which could either be filed or carried by the patient.

A little caution is not out of place. In the beginning of this study the blood and sera in the four panels disappeared after 24 hours. Investigations soon revealed that, while they are left to dry in the open, the blood cells and sera are eaten by cockroaches!

The main disadvantage of the Eldoncard is that there is no indicator to show the quality of the dried typing sera on each card. The only way to tell that a card is no longer suitable for grouping is by the change in colour of the dried sera; the wrinkled surface of the test panels and when the covering paper adhers to the dried sera. Eldoncards are also costly.

When a 50 percent suspension of washed cells is used, the Eldoncard method of grouping is as reliable as the tile method using Ortho Diagnostics antisera. The instructions supplied by the manufacturers are easy to follow. Girls without any basic laboratory training have performed many of these tests correctly. Weak A subgroups of importance to transfusion are said to give clear-cut reactions on the cards.

Brun (1965) reported favourably on his 12 years experience with Eldoncards in the Copenhagen County Hospital, Gentofte. Eldoncard is the only method of ABO-D grouping used in the blood bank. Of 92,000 portions of blood used for transfusion, 3 haemolytic transfusion reaction were recorded. One of these patients had anti-c antibody of the incomplete type; one was caused by an ABO error due to a manually produced deficient card; the third was probably due to an anti-Kidd antibody.

A total of 128,000 ABO-D groupings were reported. The accuracy was checked by: 20,000 double tests; 11,600 reverse serum groupings and 2,000 ABO-D groupings by the classical technique. He reported a total of 25 errors (1 : 5,000) attributable to the Eldoncard method.

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Synopsis

303 blood samples from antenatal patients are typed for ABO-D grouping. Each sample is typed by Eldoncards as well as the conventional tile method. Eldoncards are found to be as reliable as the conventional tile method of typing.

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