Color Vectorcardiograms Recorded in Two Unusual Cases*

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We have attempted to facilitate the understanding of vectorcardiography by the use of the color vectorcardiogram. The color vectorcardiogram is a horizontal plane vectorcardiogram in which colors of spots of the vector loop are changed corresponding to variations in height of the deflections in the Y axis. Therefore, the spatial vectorcardiogram can be represented by a single, colored graph. In our previous studies, the method for recording the color vectorcardiogram was reported, and typical examples of the color vectorcardiogram were shown in patients with myocardial infarction. However, there are some cases in which diagnostic accuracy in interpretation cannot be satisfactorily attained by our usual methods. This report deals with two such unusual cases.

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**CASE REPORTS**

**Case 1**

Figure 1 A, B illustrates color vectorcardiograms in the horizontal plane, which were recorded in a 40-year-old man with inferior (diaphragmatic) myocardial infarction. Figure 1A represents the color vectorcardiogram, which was recorded according to our usual method. The spots of the QRS loop are almost all reddish in color, indicating that most of the QRS loop projects upward. However, in the initial deflection of the QRS loop (Fig 1A), the colors of the spot are obscure because of intersection with the T loop. Since the vectorcardiographic criterion for inferior myocardial infarction is abnormal upward projection in the initial deflection of the QRS loop, it is important in diagnosis that the colors of the spots in this portion are disclosed. For the purpose of disclosing those colors, therefore, the color vectorcardiogram excluding the T loop was recorded as shown in Figure 1B, where the early half of the QRS loop, including its initial deflection is reddish in color, indicating that it projects abnormally upward. Thus, in this case a diagnosis of inferior myocardial infarction can be readily made by the use of the color vectorcardiogram.

**Figure 1.** Color vectorcardiograms including T loop (A) and excluding T loop (B), recorded in case of inferior myocardial infarction. Each interval between spots represents 2 msec.
Figure 2. Color vectorcardiograms in case of left ventricular hypertrophy, recorded according to usual sensibility (A) and decreased sensibility (B) to voltage in the Y axis. Each interval between spots represents 2 msec.

Case 2

Figure 2A, B represents color vectorcardiograms in the horizontal plane, which were recorded in a 48-year-old woman with rheumatic aortic insufficiency complicating mitral stenosis. The color vectorcardiogram illustrated in Figure 2A was colored according to the usual method. The early half of the QRS loop is bluish in color, indicating that it projects downward. At first, the QRS loop shown in Figure 2A goes downward from the origin (yellow), and, passing through yellowish green (−0.4 mv in height), green (−0.8 mv), bluish green (−1.2 mv), and blue (−1.6 mv), reaches to a depth of bluish purple (more than 2.0 mv below the origin). This represents that, in the portion of bluish purple, the deflection in the Y axis is extraordinarily large. Then, the QRS loop goes upward, and, passing through blue, green, and yellow, reaches to a height of orange (0.4 mv above the origin). Finally, the QRS loop again goes downward, and returns to the origin (yellow). From the extraordinary length of the maximum QRS vector and its marked backward projection a diagnosis of left ventricular hypertrophy is made.

According to our ordinary method, any portion more than 2.0 mv below the origin is represented by bluish purple. Therefore, in cases in which the deflection in the Y axis is unusually large (Fig 2A), its exact position cannot be determined by using the ordinary method for coloring. In Figure 2B, the sensibility to the voltage in the Y axis was decreased so that the depth of the maximum deflection in the Y axis might be decided. In this color vectorcardiogram, the deepest portion of the QRS loop is represented by bluish green, indicating a level of 2.4 mv below the origin.

The placement of electrodes was determined following the method of Frank, in both cases.

Discussion

As shown in our previous studies, satisfactorily satisfactory accuracy in vectorcardiographic interpretation can be attained by the use of a single, colored graph, i.e., a color vectorcardiogram, in nearly the same degree as that of the conventional three-plane vectorcardiography. However, in a few of the cases where the color vectorcardiogram is recorded only according to our usual method, the color vectorcardiogram may represent inaccurate spatiality. We think that one of the main reasons for this is intersection of the QRS loop with the T loop, and the other is extraordinary length of the maximum deflection in the Y axis. In this paper, color vectorcardiograms recorded in two patients are reported as examples of such cases.

In both cases, however, satisfactory accuracy in spatial representation can be attained by slight modification of the method: In case 1, where the QRS loop intersects the T loop, the color vectorcardiogram excluding the T loop was recorded. In case 2, where the deflection in the Y axis is unusually large, the sensibility to the voltage in the Y axis was decreased.

By adding these modifications the diagnostic scope of the color vectorcardiogram may be readily increased.

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References

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