

# Diagnostic Value of Body Surface Mapping in the Wolff-Parkinson-White (WPW) Syndrome

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The treatment of tachyarrhythmias has become one of the most important problems of modern cardiology. Surgical treatment of arrhythmias is used in cases in which conservative therapy is ineffective. For the effective treatment of tachyarrhythmias by surgical means it is necessary to solve the problem of the exact localization of arrhythmogenic areas, i.e. a topical diagnosis. For patients with the WPW syndrome it is the localization of the Kent bundle.

Intraoperative electrophysiological investigation of the heart is an effective method to solve this problem and to find the earliest site of excitation in the ventricles. In the preoperative period, invasive endocardial electrophysiological investigation helps to localize the Kent bundle. However, this investigation is complicated and not without risk for the patient. It is necessary to have non-invasive method which is more sensitive than electrocardiography. We have been studying the diagnostic value of body surface mapping since 1987.

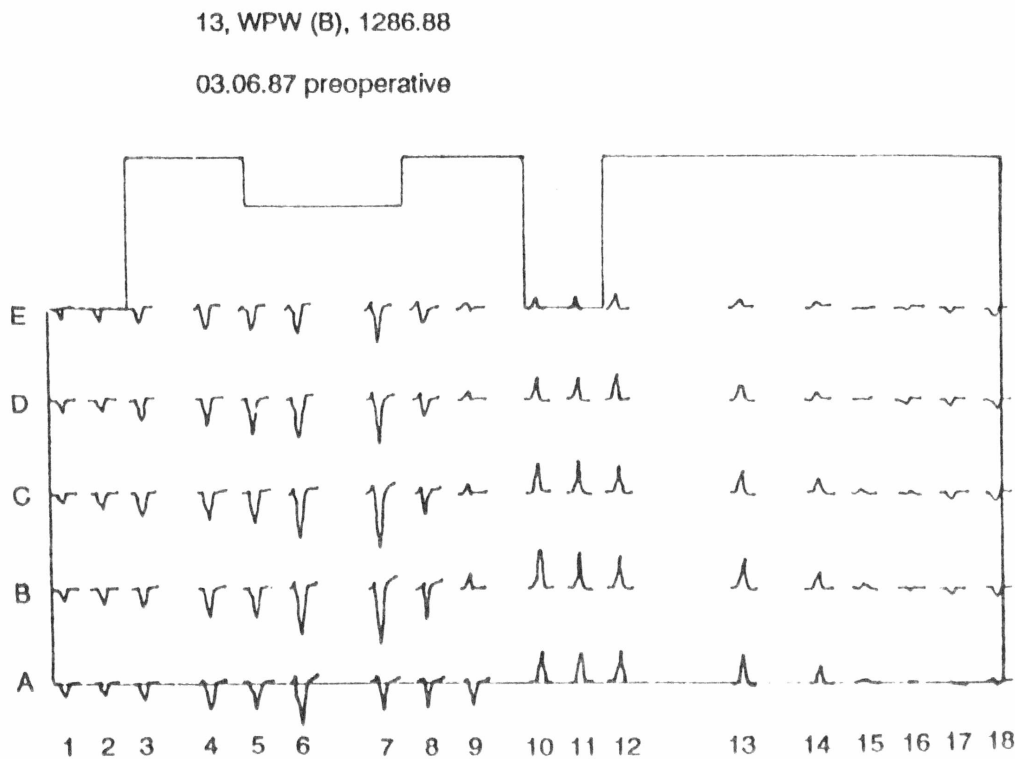


Fig. 1  
 90 QRS complexes on a schematic diagram of the chest surface in a patient with type B WPW syndrome. E-A, second to sixth intercostal spaces.

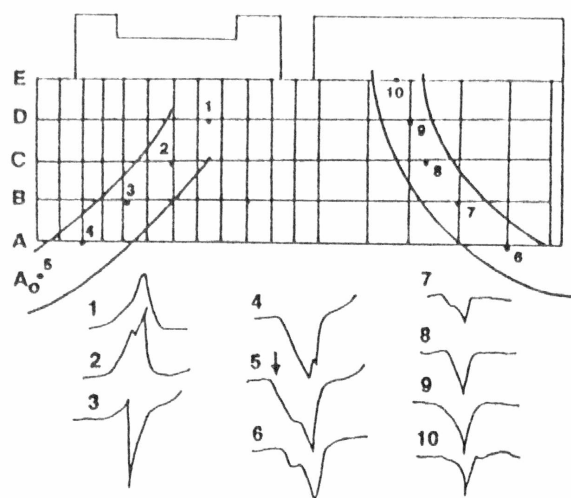


Fig. 2

The position of 10 non-traditional leads on the surface of the chest wall. Below: a non-traditional electrocardiogram of a patient with posterior septal Kent bundle.

For body surface mapping we used a recording belt with 35 unipolar electrodes (five horizontal and seven vertical rows). A special belt with 50 electrodes was designed for children. ECG processing and analysis were performed by a microcomputer system (Fig. 1).

In 1992, KARDIAG 128.1 was under our approbation. In this system recordings are made from 12 traditional leads, Frank's leads and 80 leads from the chest surface.

## References

- BOCKERIA L.A., REVISHVILI A. SH., POLYAKOVA I.P.: Body surface mapping and nontraditional ECG leads in patients with Wolff-Parkinson-White syndrome. *PACE* 13: —, 1990.

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Patients with clinically manifested WPW syndrome (158 altogether) underwent body surface mapping in the preoperative period. A criterion for localizing the anomalous accessory pathways was proposed on the basis of a comparison of data from selective coronary angiography, ventriculography and chest X-ray findings. Such criterion was the appearance of a minimal deflection of the surface isopotential maps within the first 0–28 ms of the QRS complex (Bockeria *et al.* 1990).

We suggested a new system for comparing surface mapping and X-ray data which employs several unusual leads (10–20 leads). They are registered from the atrio-ventricular groove projection onto the chest surface. The number of non-traditional electrocardiographic leads depends on the patient's age, weight and height. It is possible to analyze the activity in these non-traditional leads without a computer. We search for a small area on the chest surface, with the projection of the atrio-ventricular groove, where the earliest negative deflection of the QRS complex appears (Fig. 2).

Our results show that the above criterion provides reliable localization of a single accessory pathway in patients with a clinically manifested WPW syndrome (in one of the seven zones of the atrio-ventricular groove). In the contemporary practice, body surface mapping can replace invasive electrophysiological investigation during preoperative examination of a patient. In 105 patients with a manifested WPW syndrome, the preoperative localization of an anomalous accessory pathway was enabled by body surface mapping only.