INTRODUCTION

Standard 12-lead electrocardiography (ECG) may show a great variety of abnormalities in patients with hypertrophic cardiomyopathy. ECG is important for the first diagnostic screening of this disease, but new diagnostic modalities, such as magnetic resonance (MR) imaging, MR spectroscopy and positron emission computed tomography, have greatly contributed to the diagnosis of hypertrophic cardiomyopathy and to the interpretation of its morphological and pathophysiological features. We describe a case of hypertrophic cardiomyopathy with unusual ECG findings, and discuss the significance of the changes in relation to the MR imaging findings.

CASE REPORT

A 62-year-old man was referred to our hospital for investigation of abnormal electrocardiography findings. The mean frontal plane QRS axis was directed toward the right superior quadrant (125°). Terminal S waves were present in all 3 bipolar standard leads and an R wave in lead aVR. RS complex was seen in lead aVL, and deep S waves in leads aVF, V2-6. Left ventricular hypertrophy associated with asymmetrical septal hypertrophy was suspected based on transthoracic echocardiography, but the echocardiographic quality was poor. Magnetic resonance imaging revealed hypertrophic cardiomyopathy with massive wall thickening involving the right anterobasal region of the ventricular septum. Magnetic resonance imaging may provide useful information about the distribution of ventricular myocardial hypertrophy in patients with hypertrophic cardiomyopathy and unusual electrocardiography findings.

Key Words
- Cardiomyopathies, hypertrophic
- Electrocardiography
- Magnetic resonance imaging

Hypertrophic Cardiomyopathy With Dominant Hypertrophy in the Right Anterobasal Region of the Ventricular Septum: A Case Report

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Abstract

A 62-year-old man was referred to our hospital for investigation of abnormal electrocardiography findings. The mean frontal plane QRS axis was directed toward the right superior quadrant (125°). Terminal S waves were present in all 3 bipolar standard leads and an R wave in lead aVR. RS complex was seen in lead aVL, and deep S waves in leads aVF, V2-6. Left ventricular hypertrophy associated with asymmetrical septal hypertrophy was suspected based on transthoracic echocardiography, but the echocardiographic quality was poor. Magnetic resonance imaging revealed hypertrophic cardiomyopathy with massive wall thickening involving the right anterobasal region of the ventricular septum. Magnetic resonance imaging may provide useful information about the distribution of ventricular myocardial hypertrophy in patients with hypertrophic cardiomyopathy and unusual electrocardiography findings.

Key Words
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sue, but the apical view showed slight indications of the presence of left ventricular hypertrophy associated with asymmetrical septal hypertrophy. The difficulty in the echocardiographic evaluation seemed to be due to the muscular physique of the patient. Single photon emission computed tomography with technetium-99m tetrofosmin revealed myocardial hypertrophy localized in the anterobasal portion of the ventricular septum (Fig. 2). MR imaging was performed to evaluate the ventricular hypertrophy accurately, and revealed hypertrophic cardiomyopathy with massive wall thickening involving the right anterobasal region of the ventricular septum (Fig. 3). This finding was considered to be consistent with the unusual ECG changes. The patient has remained clinically stable and asymptomatic, and his ECG findings have also remained unchanged for the past 5 years.

DISCUSSION

Standard 12-lead ECG shows abnormal findings in 85% to over 90% of patients with hypertrophic

Fig. 1 Electrocardiographic findings
The mean frontal plane QRS axis is directed toward the right superior quadrant (\( 125^\circ \)). Terminal S waves are present in all 3 bipolar standard leads and an R wave is seen in lead aVR. An RS complex is seen in lead II, and deep S waves are evident in II, III, aVF.
Deviations of the mean frontal plane QRS axis superiorly and to the right are rare
and occur in 2% of patients with hypertrophic cardiomyopathy. The significance of such uncom-
mon QRS axis deviation is still unclear. Wigle et al. reported the effects of ventriculomyotomy in 3
patients with hypertrophic cardiomyopathy and abnormal hypertrophy was located mainly in the
anterior end of the septum and the immediately adjacent left ventricular anterior wall. The septal
hypertrophy may have resulted in dominance of anteroseptal over posteroinferior electrical forces
that could be altered by septal incision. This patient had localized hypertrophy of the anterobasal
region, and produced a small q wave in leads Q and all, a small r wave in leads Q, Q, and V, an R
wave in the right precordial chest leads, and a q wave in the left precordial leads. The QRS com-
plexes caused by the spread of excitation through the 2 ventricles were considered to be modified by
the localized hypertrophy of the anterobasal septum, which would cancel the normal frontal QRS
axis in the limb leads and produce deep terminal S waves in all limb leads (except aVR) and in the
precordial leads (except V1).

Echocardiography is widely accepted as a useful tool for the diagnosis of hypertrophic cardiomyopa-
thy, but hypertrophy of a localized region of the basal ventricular septum is an incidental echocardio-
diographic finding in most cases. Maron et al. observed hypertrophy limited to the anterior sep-
tum (type I) in 12% of 125 patients with hypertrophic cardiomyopathy. The prevalence of normal
ECG in the patients with this type I was significantly greater than in the other 3 morphologic types. How-
ever, in the majority of their type I patients, hypertrophy was not limited to the ventricular sep-
tum and extended to the apical portion of the left ventricle. Belenkie et al. emphasized that hyper-
atrophy localized to the basal septum infrequently represented part of the spectrum of hypertrophic
cardiomyopathy. We speculate that the unusual ECG findings in the present case reflect the massive
bulge of myocardium localized in the right antero-
basal region of the ventricular septum.

The advantages of MR imaging over echocardiog-
raphy include a large field of view that provides
more accurate diagnostic information in almost all
patients. The present case of the use of MR imaging to identify hypertrophic cardiomyopathy
with dominant hypertrophy in the right anterobasal
region of the ventricular septum indicates that MR

Fig. 3 Magnetic resonance image showing ventricular hypertrophy with asymmetrical septal hyper-
trophy.
The right anterobasal region of the ventricular septum is markedly thickened and protrudes into the right
ventricular outflow tract (arrow).
RV = right ventricle; RA = right atrium; LV = left ventricle; LA = left atrium.
imaging can yield additional insight into the features of hypertrophic cardiomyopathy in relation to specific ECG abnormalities which might be impossible to clarify by echocardiography.

要約
心室中隔基部の右室側前方に著しい肥大を伴った肥大型心筋症の1例
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症例は62歳の男性で、心電図異常の精査のため当科を紹介され受診した。平均前傾面QRS電気図
幅は右上方に向かう (125 ms) とすべての2肢標準誘導でS波を、またaVR誘導ではR波を認め
た。心電図記録上はRS型を示し、深いS波をI、II、V_{6}で認めた。心室壁のエコー図で非対称性中隔肥
厚を伴う左室肥大の存在が疑われたが、エコー図での指摘は不明であった。磁気共鳴像で心室中
隔基部の右室側前方に、著しい局所的な肥厚を伴った肥大型心筋症であることが明らかになった。
特異な心電図所見を伴う肥大型心筋症において、その心室の肥大部位に関する情報を得うえで、
磁気共鳴像検査は有功と思われた。

References
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