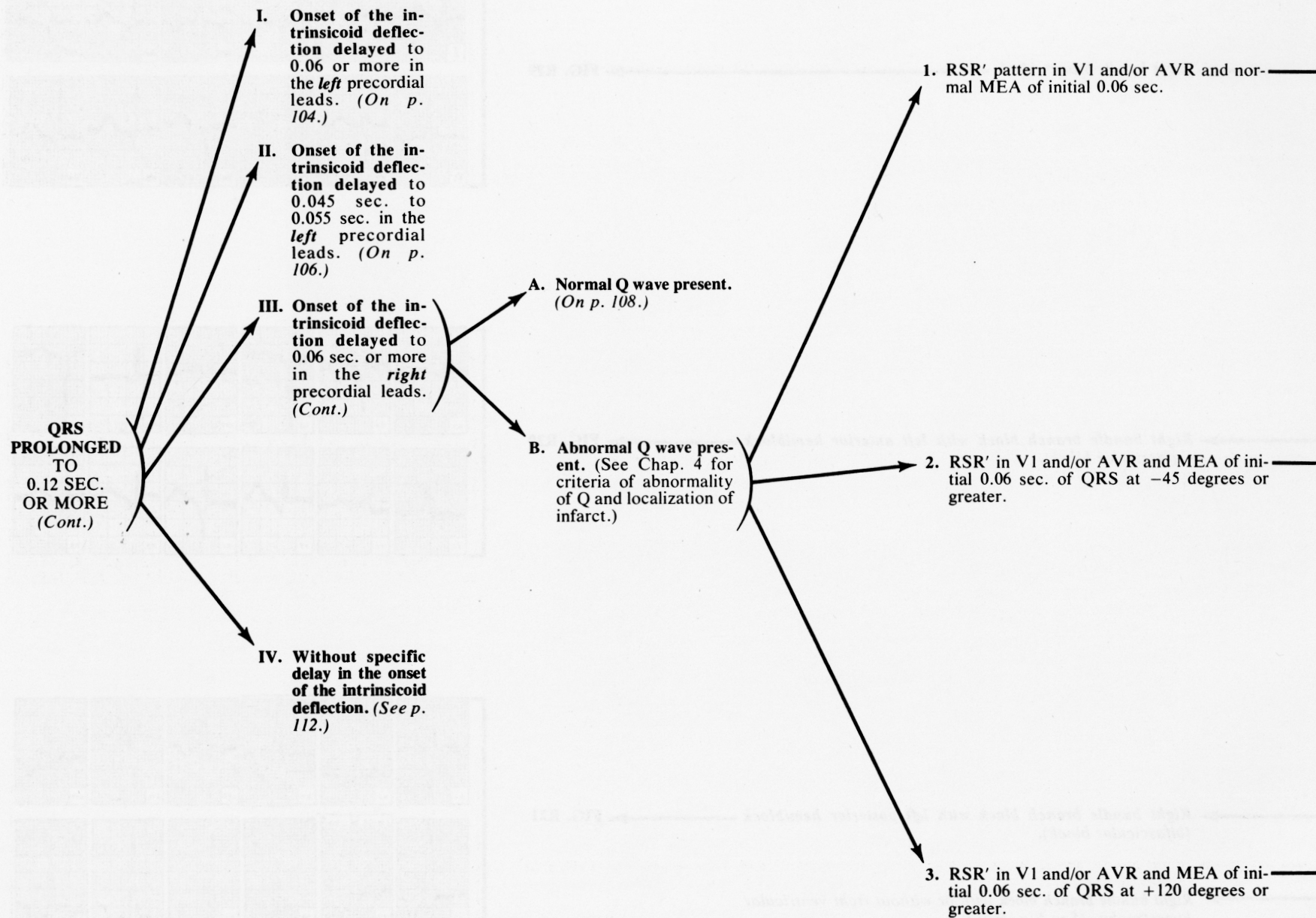
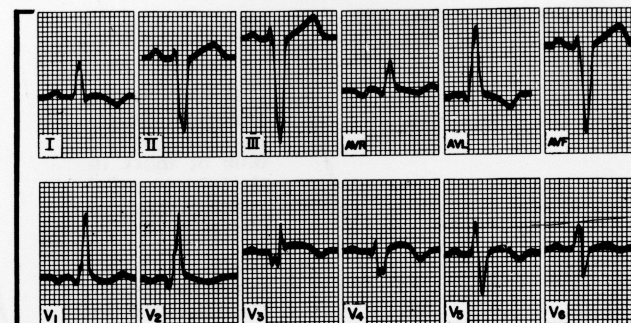


QRS ABNORMAL DUE TO:
Prolongation of Its Duration (Cont.)



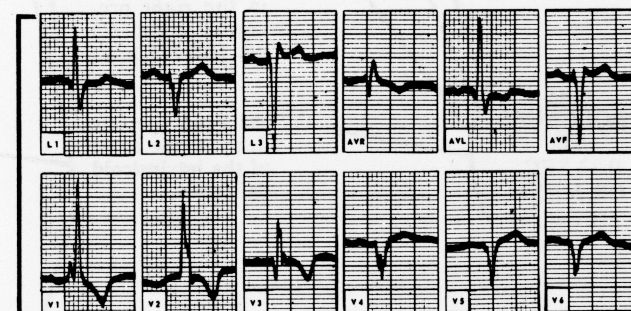
→ **Right bundle branch block with myocardial infarct. Localization depends upon location of Q wave. (See Chap. 4.)**

→ **FIG. R22**



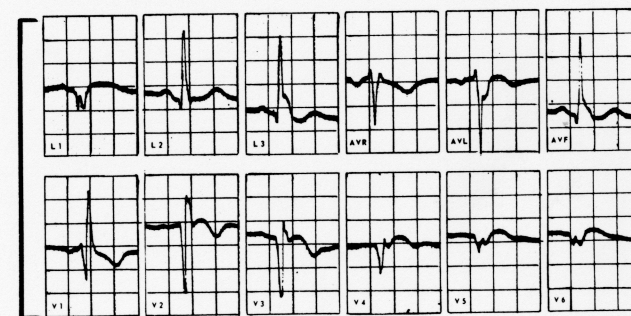
→ **Right bundle branch block with left anterior hemiblock and myocardial infarct.**

→ **FIG. R23**



→ **Right bundle branch block with left posterior hemiblock and myocardial infarct.**

→ **FIG. R24**



QRS ABNORMAL DUE TO:
Prolongation of Its Duration (Cont.)

**QRS
 PROLONGED
 TO
 0.12 SEC.
 OR MORE
 (Cont.)**

- I. Onset of the intrinsicoid deflection delayed to 0.06 or more in the *left* precordial leads. (On p. 104.)**
- II. Onset of the intrinsicoid deflection delayed to 0.045 sec. to 0.055 sec. in the *left* precordial leads. (On p. 106.)**
- III. Onset of the intrinsicoid deflection delayed to 0.06 sec. or more in the *right* precordial leads. (On pp. 108-110.)**

- IV. Without specific delay in the onset of the intrinsicoid deflection.**

A. With or without S-T and T wave changes.

B. With abnormal Q waves.

C. With high, peaked T waves.

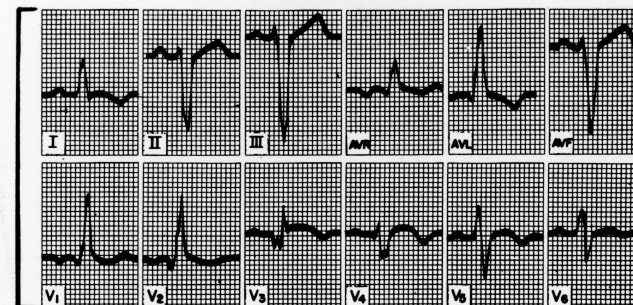
D. QRS upright in right and left precordial leads with initial component (Δ wave) upright in same leads.

1. S-T directed obliquely upward in a straight line from the depressed J to the peak of the T. P frequently absent.

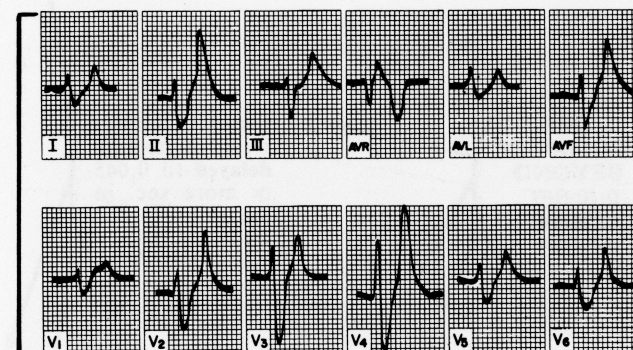
1. With short P-R interval.

→ *Intraventricular conduction defect. (See Fig. R16.)*

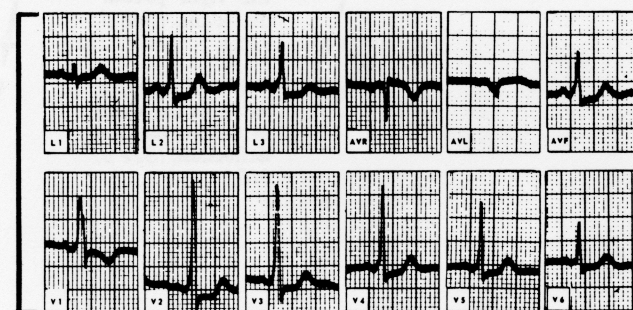
→ *Intraventricular conduction defect with myocardial infarction. (See Chap. 4 for localization.) (See also Fig. R18.)* → **FIG. R25**



→ *Probable hyperkalemia.* → **FIG. R26**



→ *Pre-excitation syndrome (WPW, type A).* → **FIG. R27**



QRS ABNORMAL DUE TO:
Prolongation of Its Duration (Cont.)

QRS
PROLONGED
BEYOND
0.10 SEC.
UP TO
0.12 SEC.

I. Onset of intrinsicoid deflection delayed to 0.045 or more sec. in the *left* precordial leads and usually in L1 and AVL.

II. Onset of intrinsicoid deflection delayed to 0.05 sec. or more in the *right* precordial leads. (See p. 116.)

III. Without specific delay in the onset of the intrinsicoid deflection. (See p. 116.)

A. No Q waves present in these leads.

1. S-T depressed and T inverted in these same leads.

2. Slurred and notched R in these leads.

3. Small r and deep, prolonged S in V1 and V2 (or QS).

4. In addition to 1, 2, and 3 above, high voltage.

B. Normal Q wave present.

1. R voltage normal and QRS usually notched or slurred.

2. With or without S-T segment shift.

3. T normal or abnormal.

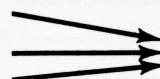
4. MEA normal.

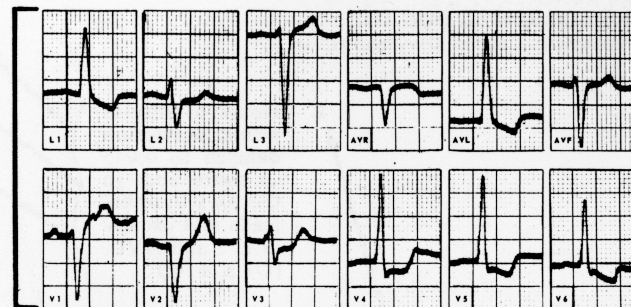
C. Abnormal Q wave present. (See p. 116.)

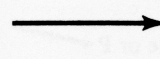
5. High voltage QRS.


6. S-T depressed and/or T inverted in the left precordial leads.

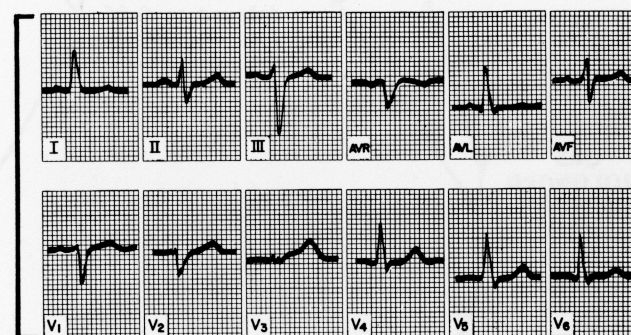
7. With marked prolongation of Q-T interval.



 Incomplete left bundle branch block. → FIG. R28

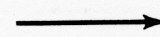


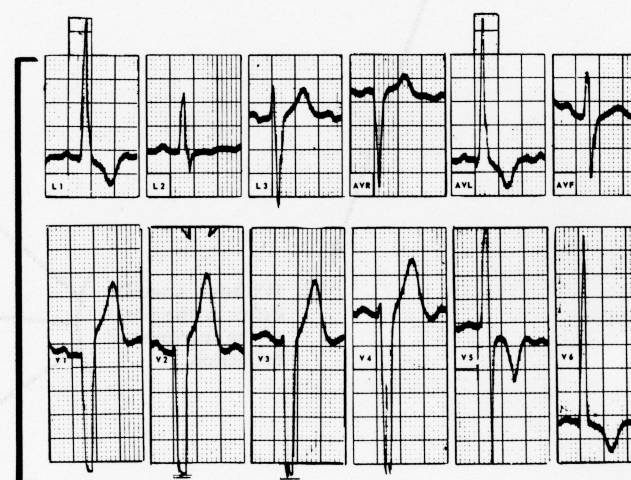

 Incomplete left bundle branch block with or without left ventricular hypertrophy.


 Intraventricular conduction defect. → FIG. R29




 Left ventricular hypertrophy. → FIG. R30


 Possible quinidine or other drug toxicity.



QRS ABNORMAL DUE TO:
Prolongation of Its Duration (Cont.)

**QRS
 PROLONGED
 BEYOND
 0.10 SEC.
 UP TO
 0.12 SEC.
 (Cont.)**

I. Onset of intrinsicoid deflection delayed to 0.045 or more sec. in the *left* precordial leads and usually in L 1 and AVL. (On p. 114.)

- A. No Q waves present in these leads. (On p. 114.)**
- B. Normal Q wave present. (On p. 114.)**
- C. Abnormal Q wave present.**

1. In any leads. _____

1. RSR' pattern present in V1. _____

2. S broad and slurred in V5 and V6. _____

3. High voltage of R' in same leads. _____

4. S-T depressed in the same leads. _____

5. Abnormal P wave present. (P mitrale or P pulmonale.) _____

II. Onset of intrinsicoid deflection delayed to 0.05 sec. or more in the *right* precordial leads.

A. Normal Q present.

B. Abnormal Q present.

1. In any combination of leads. _____

III. Without specific delay in the onset of the intrinsicoid deflection.

A. With or without S-T and T wave changes.

B. With abnormal Q waves.

C. With high, peaked T waves.

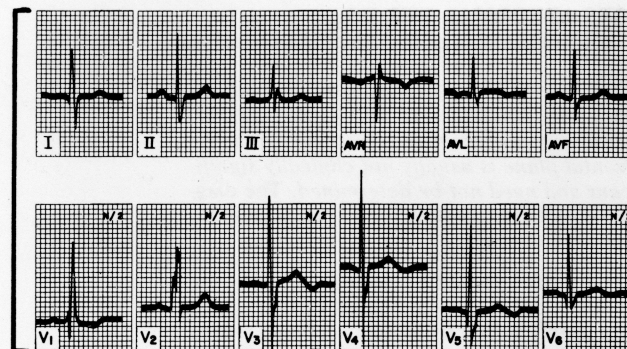
1. S-T directed obliquely upward in a straight line from the depressed J to the peak of the T. _____

→ Intraventricular conduction defect with **myocardial infarction**. (For localization of infarct, see Chap. 4.)

→ Incomplete **right bundle branch block** (or interatrial septal defect).

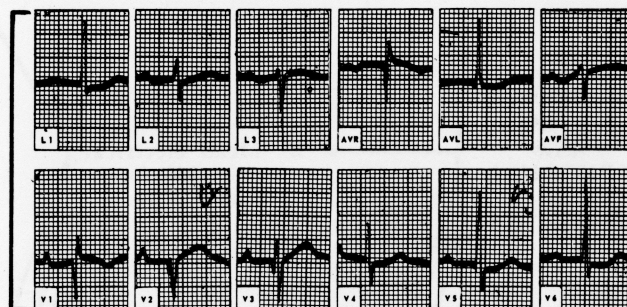
→ Incomplete **right bundle branch block** with or without right ventricular hypertrophy.

FIG. R31



→ Incomplete **right bundle branch block** with myocardial infarct. Localization of infarct is dependent upon the location of the Q wave. (See Chap. 4.)

FIG. R32

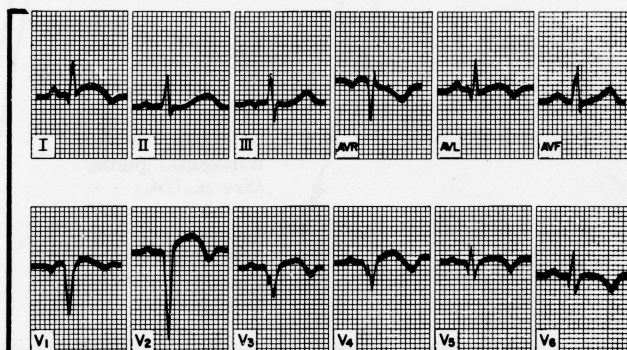


→ Intraventricular conduction defect.

→ Intraventricular conduction defect with myocardial infarction. (See Chap. 4.)

FIG. R33

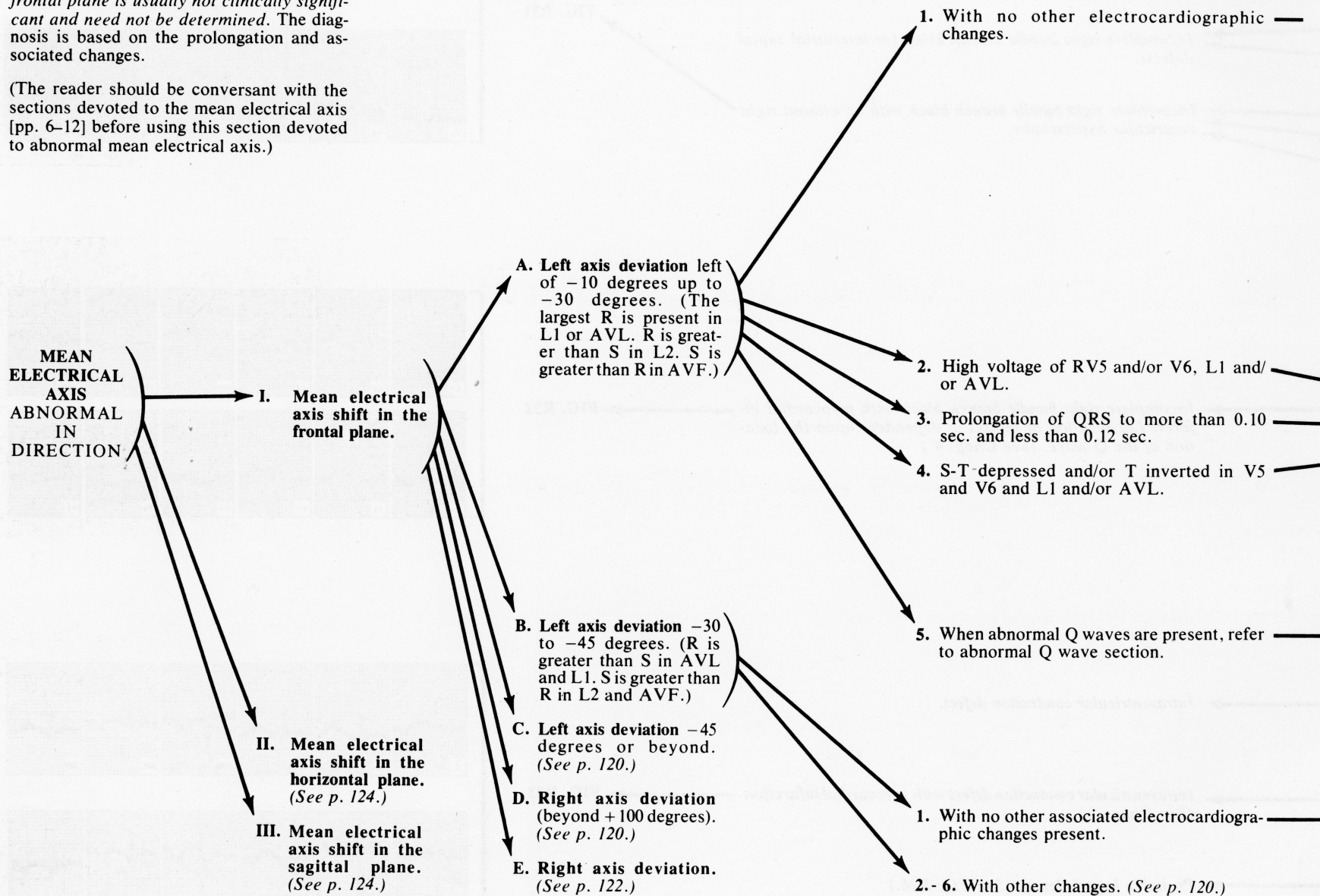
→ Probable **hyperkalemia**. (See Fig. R26.)



QRS ABNORMAL DUE TO:
Shift in Direction of the Mean Electrical Axis

When the QRS is abnormally prolonged and excessive notching and slurring are present, the direction of the mean electrical axis in the frontal plane is usually not clinically significant and need not be determined. The diagnosis is based on the prolongation and associated changes.

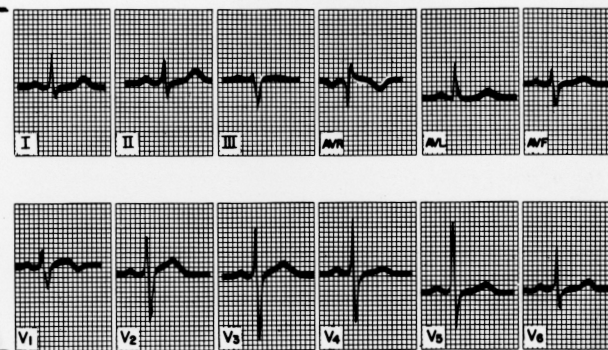
(The reader should be conversant with the sections devoted to the mean electrical axis [pp. 6-12] before using this section devoted to abnormal mean electrical axis.)



*Left axis deviation is almost always abnormal in children and is suggestive of congenital heart disease.

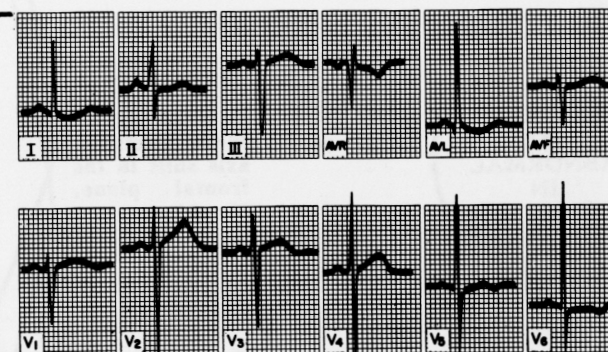
→ **Left axis deviation.** * If not associated with other changes, is usually normal with the heart in a horizontal position. Frequently occurs in patients with hypersthenic habitus, obesity, and other conditions in which the diaphragm is elevated.

→ FIG. R34



→ The probability of **left ventricular hypertrophy** increases with each of these additional criteria.

→ FIG. R35



→ **Myocardial infarction.**

→ **Marked left axis deviation.** * Usually abnormal. May be left anterior hemiblock if qR pattern is present in L1 and/or AVL. Commonly associated with myocardial damage especially when T abnormalities are present.

→ FIG. R36

