

世界经典内科学教科书
心血管内科学有声教材
英汉对照

心脏听诊进阶教程 ——心音与杂音

HEART SOUNDS AND MURMURS
ACROSS THE LIFESPAN

■ 原著 [美] Barbara Erickson

■ 主译 王永兴



第4版

世界图书出版公司

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(英汉对照 配附光盘)

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前 言

心脏听诊是评价心血管系统最基本的和有效的技术。在有了其他器械检查方法后心脏听诊技术几乎都不用了。但近年来,在控制医疗费用的压力下又被重视而选用。与其他诊断方法如心电图(ECG)、食管超声心动图(TEE)及心导管检查相比,心脏听诊既价廉又便捷。而非常昂贵的检查结果往往还需要心脏听诊来明确其意义。因此,心脏听诊是一项必须掌握的基本技能。从正确使用听诊器中获得的信息是无价的。在一个熟练掌握听诊方法的医生手中,听诊器是无价之宝。

拥有一个高质量的听诊器并非就能很自然地获得熟练的听诊技术。有效听诊最重要的先决条件是拥有一个有准备的头脑。在听诊时,医生应该清楚心动周期的血流动力学变化,并把听到的每一种心音与相应的血流动力学变化相联系。

本书第4版扩充了前几版的内容与解释,尚有儿童和老年人的特殊心音,以及多数成人心脏畸形的听诊方法等。这本书是为初学心脏听诊者学习听诊、解释心音的基本方法而编写的,而较熟练掌握听诊技术的人也会发现这本书作为复习也很有用。本书所介绍的方法在作者多年的心脏听诊教学中被证实是很成功的。文中的基本内容都配有相应的录音材料。通过阅读该书,然后听录音材料,学生就能够掌握理解、辨认正常心音和许多常见异常心音的基本和知识。

在临床上,要熟练地辨认心音,学生要尽可能多地听诊不同的实际的心音。录音材料中所模拟的心音再好,也替代不了听真实心音的经验。而记住录音材料中模拟的清晰的心音则能够促进学习。从实体心脏中听到的声音不会像模拟的心音那么清楚。多数心音是通过心音模拟器在录音室中通过良好的录音设备录制的,仅有很少的声音是从人体心脏中录制的。

Barbara Erickson

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LEARNING OBJECTIVES

CHAPTER

1

第1章

Introduction

绪论

HISTORY

The language of the heart, discovered by cardiac auscultation, is a universal medical language. I was dramatically made aware of this while visiting China where communications needing no interpretation were those of heart sounds: electrocardiograms and music. By becoming skillful in listening to and interpreting the language of the heart, you will join a long line of notable cardiologists.

Direct auscultation of the heart was known to Hippocrates (460-377 BC) who may have used heart sounds for diagnostic purposes. William Harvey (1578-1657) seems to have been the first to make specific reference to heart sounds. The use of the ear without mechanical aid was the accepted method of listening to the heart until 1816, when René Laennec invented the first stethoscope (Laennec (1781-1826), by discovering and

LEARNING OBJECTIVES

After reading this chapter and answering the self-learning questions at the end of the chapter, the learner will be able to:

1. Identify the requirements for adequate cardiac auscultation.
2. Differentiate between the use of the bell and the diaphragm chestpiece of a stethoscope.
3. Identify two basic mechanisms of cardiac sound production.
4. Identify the four basic characteristics of sound.
5. Differentiate between sounds of high frequency and low frequency.
6. Identify three factors that enter into the transmission of sounds.
7. Choose the appropriate area on the chest for auscultation of a selected sound.
8. Differentiate between ventricular systole, ventricular diastole and atrial systole.
9. Identify the relationship of cardiac sounds to the cardiac cycle.
10. Chart heart sounds using the one-through-six classification scale.

HISTORY

The language of the heart, discerned by cardiac auscultation, is a universal medical language. I was dramatically made aware of this while visiting China, where communications needing no interpretation were those of heart sounds, electrocardiograms and music. By becoming skillful in listening to and interpreting the language of the heart, you also may join a long line of notable semiologists.

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学习目的

学完本章并回答章后的练习题,学生可以:

1. 明确心脏听诊要求。
2. 区分听诊器钟型和膜型体件的用途。
3. 掌握心音产生的两个基本机制。
4. 掌握心音的4个基本特征。
5. 能辨别高频和低频声音。
6. 掌握参与心音传导的3个因素。
7. 选择正确的听诊部位。
8. 能区分心室收缩、舒张和心房收缩。
9. 掌握心音与心动周期的关系。
10. 能用1~6级分类法描述心音。

历史

关于心脏的语言可以通过听诊获得,这是通用的医学语言,在笔者访问中国时,对此有深刻理解。其间,不用翻译的就是心音、心电图和音乐。通过熟练地听和解释心脏的语言,你将成为出色的症状学家。

希波克拉底(460—377BC)很早就知道直接听诊心脏,他能用心音来诊断疾病。William Harvey(1578—1657)可能是最先用心音来诊断疾病的人。直到1816年,Rene Laënnec(1781—1826)发明第一个听诊器时,人们还尚未借助机器设备,而是直接用耳朵

perfecting the acoustic trumpet, became known as the “Father of Auscultation.” Laënnec named his auscultatory instrument a “stethoscope” from the Greek word meaning “the spy of the chest.” His original instrument, which was a hollow, wooden cylinder, has been repeatedly revised. These revisions have continued to the present, making available a great variety of quality stethoscopes.

However perfect the instrument of auscultation is, the interpretation of the sounds is still its essence. Although Laënnec devoted his life to the semiology of cardiac auscultation, it was a Czech doctor, Joseph Skoda (1805-1881), who first described the cardiac sounds and murmurs. He pinpointed their locations and defined the clinical auscultatory signs that have allowed the diagnosis of cardiac pathologic conditions via auscultation. The learner is advised to mimic Skoda and become proficient in pinpointing the locations of cardiac sounds and murmurs to arrive at a clinical interpretation of their meaning.

REQUIREMENTS FOR AUSCULTATION

Auscultation must not be performed as an isolated event. The total cardiovascular physical examination includes five important parts: (1) examination of the arterial pulse and blood pressure, (2) inspection of the jugular venous pulse, (3) inspection of the precordium, (4) palpation of the precordium, and (5) auscultation. Each of these parts is important, although only auscultation is discussed in this book.

One of the first things to consider when undertaking auscultation of the heart is the necessity to:

1. Use a quiet, well-lit, warm room. To facilitate hearing the heart sounds, ambient noise in the room should be eliminated as much as possible. This means that room doors are closed, equipment such as radios and televisions are turned off, and conversations are stopped. Unfortunately, a quiet room may be one of the hardest elements to achieve. The room needs to be well lit so that the inspection aspect of cardiac examination may be done. Many of the heart sounds can be seen and felt, as well as heard. A warm room helps keep the patient from shivering, thus causing extraneous sounds under the chestpiece of the stethoscope.

2. Have the patient properly disrobed. The stethoscope should al-

听心脏。Laënnec 由于发明和制作听诊器而被称为“听诊之父”。Laënnec 将他的听诊器命名为“stethoscope”是源自拉丁语“胸部的间谍”。最初他所采用的听诊装置是木制空心管状结构，后来不断得到改进。这种改进一直持续到现在，出现了许多不同材质的听诊器。

然而，不论听诊器多么完美，对心音的解释仍是最基本的。Laënnec 将一生都奉献给了心脏听诊事业，而捷克医生 Joseph Skoda (1805—1881)是第一个描述心音和杂音的人。他提出了心音听诊的部位，并把听诊到的体征进行定义，使得心脏病理状态的诊断通过听诊得以实现。学生通过模仿 Skoda 熟练掌握心音和杂音的听诊部位，并进一步掌握其临床意义。

听诊要求

听诊不能孤立进行。完整的心脏检查包括 5 个重要部分：①检查动脉搏动和血压；②观察颈静脉搏动；③视诊心前区；④心前区触诊；⑤听诊。尽管本书只讨论听诊部分，但每个部分的检查都很重要。

心脏听诊注意事项：

1. 在安静、光线好、温暖的房间进行心脏听诊。为保证听诊效果，应避免噪音，也即应关门、关闭收音机、电视机，停止谈话。然而，上述要求很难达到。一个房间的装备应达到心脏检查的视诊要求，许多心音可以像被听到一样被看到和触摸到。温暖的房间可以避免患者发抖，以及因此而产生的额外音。

2. 适当暴露患者。听诊器应直接与胸壁接触。因为异常心音

ways be placed in direct contact with the chest wall. Most abnormal sounds cannot be heard through clothing because they are lower in frequency and softer than normal heart sounds. Also, listening through clothing will produce sound distortions caused by the stethoscope rubbing against the clothing.

3. Examine the patient in three positions-sitting, supine, and left lateral recumbent (Figure 1-1). Listening with the patient in various positions will bring out certain heart sounds, especially some abnormal ones. For instance, the third heart sound (S_3) may be brought out by having the patient turn to the left lateral recumbent position.

4. Examine the patient from his or her right side. Being on the patient's right side forces the examiner to reach across the chest to listen to the heart. This stretches out the tubing of the stethoscope and decreases the likelihood of extraneous sounds caused by the tubing hitting objects (e.g., chest wall, side rails).

5. Use a stethoscope with a bell and diaphragm chestpiece or one with characteristics of both bell and diaphragm. Traditionally, a stethoscope with both a bell and a diaphragm was essential for complete cardiac auscultation. However, recent technology has provided a stethoscope with only one chestpiece capable of differentiating low-frequency from high-frequency sounds, depending on the pressure applied to the chestpiece. When the chestpiece is used with light pressure, the low-fre-

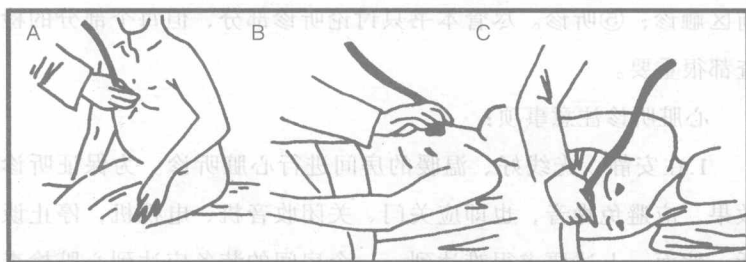


Figure 1-1 Basic positions for cardiac auscultation. A. Sitting. B. Supine. C. Left lateral recumbent. (Reproduced with permission from Caccamo L, Erickson B: Cardiac auscultation, Youngstown, Ohio, 1975, St. Elizabeth's Hospital Medical Center.)

比正常心音频率低、强度弱，所以多数异常心音隔着衣服听不到。

而且，隔着衣服听诊会出现由于听诊器与衣服摩擦所导致的声音改变。

3. 从3种体位来检查——坐位、仰卧位、左侧卧位（图1-1），在不同体位听诊可以听到某些心音尤其是异常心音。例如，第三心音（ S_3 ）在左侧卧位时易听到。

4. 站在患者的右侧检查。这样检查者可以在患者胸部听诊，听诊器管件充分伸展，减少由于管件与胸壁或其他物体相撞的可能。

5. 采用钟型和膜型听诊器或一个既有钟型又有膜型的听诊器。传统意义上，心脏听诊需要既有钟型又有膜型的听诊器。然而近年来技术的发展已生产出仅用一个体件并通过调节其上的压

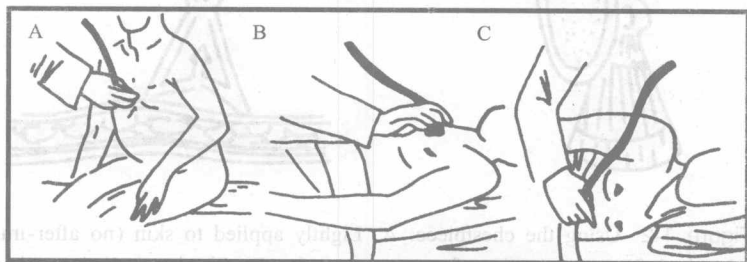


图 1-1 心脏听诊体位

A. 坐位 B. 仰卧位 C. 左侧卧位

（复制权获自 Caccamo L, Erickson B: Cardiac auscultation, Youngstown, Ohio, 1975, St. Elizabeth's Hospital Medical Center）

quency sounds dominate; used with firm pressure, the high-frequency sounds are accentuated. Regardless of the technical advances, the traditional principles still apply and therefore are used in this book.

a. Using the bell: When the bell is held lightly (leaving no after-imprint on the chest), it picks up low-frequency sounds. Pressure on the bell causes the skin to be pulled tautly over the bottom of the bell, changing the bell to a diaphragm (Figure 1-2).

b. Using the diaphragm: When the diaphragm is applied firmly (leaving an after-imprint), it picks up high-frequency sounds.

c. Differentiating frequencies: The frequency of a sound is readily identified by noting with which chestpiece of the stethoscope the sound is best heard. A sound best heard or only heard with the bell held lightly is of low frequency. A sound best heard with the bell applied firmly or with a diaphragm is of high frequency. This simple maneuver of listening to a sound with the bell held lightly and then applied firmly permits you to determine the frequency of the sound to which you are listening. This is an important point to remember.

6. Listen to each area of auscultation. Listen to each of the following areas, using first the diaphragm and then the bell (Figure 1-3).

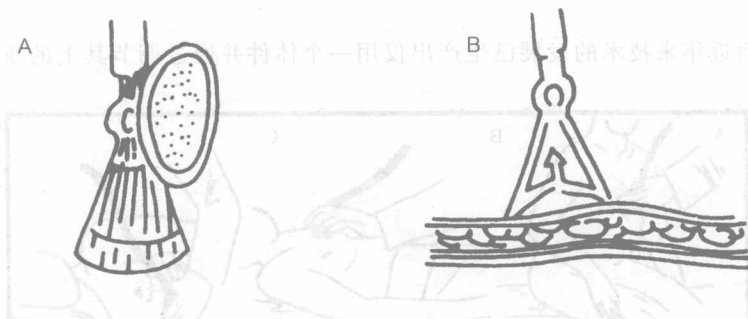


Figure 1-2 Using the chestpiece. A. Lightly applied to skin (no after-imprint is left) transmits low-frequency sounds. B. Firmly applied to skin (leaves an after-imprint) with skin pulled tautly over the bottom of the bell changes it into a diaphragm and transmits high-frequency sounds. (Modified with permission from Caccamo L, Erickson B: Cardiac auscultation, Youngstown, Ohio, 1975, St. Elizabeth's Hospital Medical Center.)

力而区分低频音和高频音。当用体件轻压时以低频音为主,当紧压时高频音较清晰。尽管技术不断发展,但传统的原理仍然适用。

a. 钟型听诊器的使用: 当较轻地按压时 (在胸壁上不留痕迹) 可以听到低频音; 用力按压时 (听诊器下的皮肤被拉动), 则导致钟型体件成为膜型体件 (图 1-2)。

b. 膜型听诊器的使用: 当用力按压时 (在胸壁上留下痕迹) 可以听到高频音。

c. 区别频率: 声音的频率可通过采用何种听诊器的体件能听到来区分。轻按钟型体件能听到的为低频音, 用力按压钟型体件或采用膜型体件能听到的为高频音。采用听诊器轻压或重压这一简单方法听诊心音使我们可以确定听到声音的频率, 这一点要牢记。

6. 要听诊每个听诊区。听诊时先采用膜型体件再采用钟型体件 (图 1-3)。

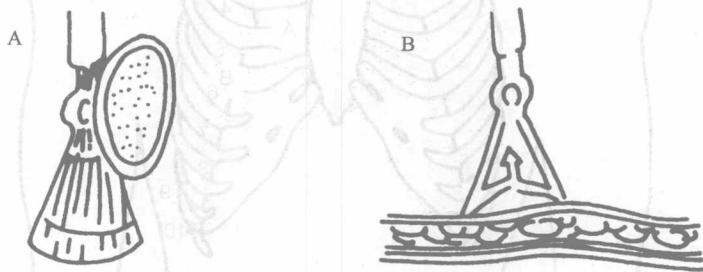


图 1-2 体件的应用

A. 轻轻按压 (不留痕迹) 可以听到低频音

B. 用力按压 (留下痕迹) 则导致钟型体件成为膜型体件, 进而可以听到高频音 (修改权获自 Caccamo L, Erickson B: Cardiac auscultation, Youngstown, Ohio, 1975, St. Elizabeth's Hospital Medical Center)

a. Left lateral sternal border (LLSB) (also known as lower left sternal border): This is the fourth intercostal space (4 ICS) to the left of the sternum. Sounds from the tricuspid valve and right heart are best heard.

b. Apex: This is the fifth intercostal space (5 ICS) in the midclavicular line. Sounds from the mitral valve and left heart are best heard.

c. Base right (previously known as aortic area): This is the second intercostal space (2 ICS) to the right of the sternum. Sounds from the aortic valve are best heard.

d. Base left (previously known as pulmonic area): This is the second intercostal space (2 ICS) to the left of the sternum. Sounds from the pulmonic valve are best heard.

7. Use a sequence for auscultation. Each time you listen to a heart,

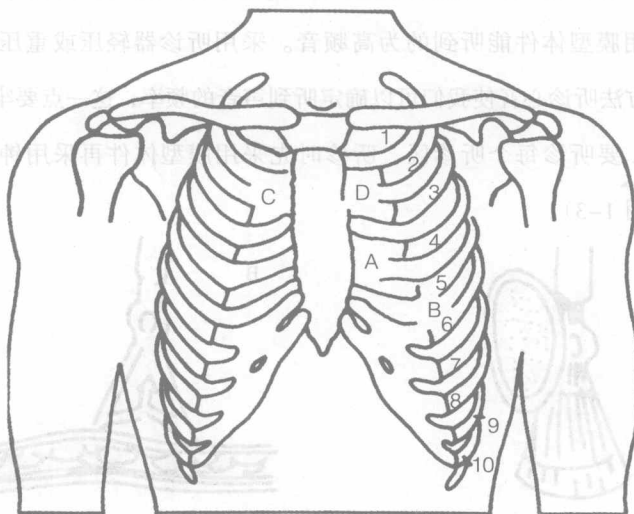


Figure 1-3 Sites for auscultation. A. Left lateral sternal border (sounds from tricuspid valve and right side of heart heard best). B. Apex (sounds from mitral valve and left side of heart heard best). C. Base right (sounds from aortic valve heard best). D. Base left (sounds from pulmonic valve heard best).

a. 胸骨左缘 (LLSB) 也称为左侧胸骨边缘, 位于胸骨左缘第 4 肋间 (4ICS), 源自三尖瓣及右心的心音听诊效果最好。

b. 心尖部位于左锁骨中线第 5 肋间 (5ICS)。源自二尖瓣及左心的心音听诊效果最好。

c. 心底部右侧 (过去称为主动脉区) 位于胸骨右缘第 2 肋间 (2ICS), 源自主动脉瓣的心音听诊效果最好。

d. 心底部左侧 (过去称为肺动脉区) 位于胸骨左缘第 2 肋间, 源自肺动脉瓣的心音听诊效果最好。

7. 按顺序听诊。每次听诊心脏, 从相同的听诊区开始, 听上

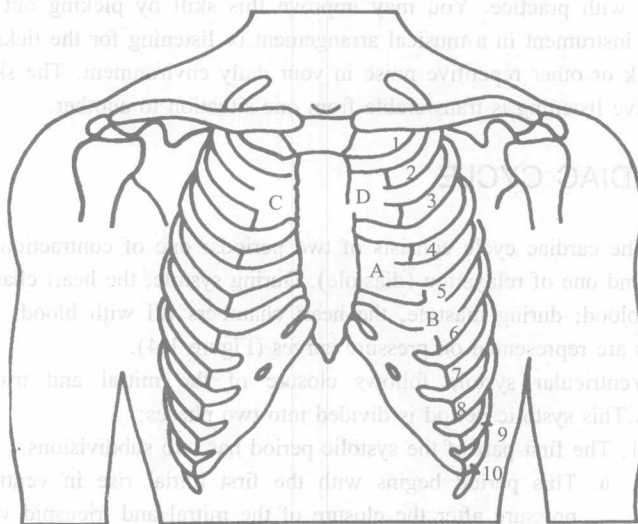


图 1-3 听诊部位

- A. 胸骨左缘 (源自三尖瓣及右心的心音听诊效果最好)
- B. 心尖部 (源自二尖瓣及左心的心音听诊效果最好)
- C. 心底部右侧 (源自主动脉瓣的心音听诊效果最好)
- D. 心底部左侧 (源自肺动脉瓣的心音听诊效果最好)