Who is Mr. "K"

Simulator "K" is a simulated cardiology patient for clinical training. He facilitates total training in bedside clinical examination skills and ensures quality of training in auscultation of heart sounds and murmurs. He was born in Japan in 1997.

Production supervision:
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Graduate School of Information Science and Engineering,
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Obtaining reliable auscultation skills

Auscultation is a fundamental approach to cardiac patients, performed widely from general practitioners to cardiologists. Repeated practice is a necessity for learners to differentiate various heart sounds and murmurs. However, opportunities to learn with real patients are limited and could be insufficient. Simulator "K" offers hands-on experience in a diversity of cases.

Real sounds, real instruments, real anatomy

Sounds are recorded from actual people and reproduced using a high quality sound system. An actual stethoscope can be used. Auscultation sites corresponding to heart valves are located precisely on a life-size manikin body molded from an actual person.

Wide variety of the examples

Simulator "K" contains 88 cases; 12 cases of normal heart sounds, 14 cases of heart disease simulations, 10 cases of arrhythmia simulations and 52 cases of ECG arrhythmia simulations.

Comprehensive clinical examination training

Physical findings synchronize perfectly with each other.

Construct an original education program

Sound volume, pulse strength, simulation speed and running time are controllable.
Observation of jugular veins
Pulsation of jugular venous waves can be observed on both sides. The strength and timing of "a" and "v" waves which vary in each case can be observed just as with real cardiac patients.

Respiratory sounds and observation of abdominal movement (for cases HR: 60/ mm)
Tracheal and bronchial breath sounds and abdominal movement are simulated to facilitate understanding of respiratory related phenomena such as Rivelo-Carvallo sign, respiratory splitting and timing of murmurs.

Palpation of cardiac impulses (RV, LV and DLV)
Cardiac impulses are palpable at sites of Right Ventricle, Left Ventricle and Dilated Left Ventricle. Various cardiac impulses under different cardiac conditions are simulated.

Palpation of arteries
The carotid, medial, radial and femoral arteries are palpable at eight sites on the manikin. Slight variations of the arterial pulse waves under different cardiac conditions or arrhythmias can be detected by palpation.

Heart sounds & murmurs
In all cases listening can be performed at the four primary cardiac auscultation sites (aortic, pulmonic, tricuspid, and mitral). Auscultation of first sound (S1) and second sound (S2) can be learned in relation to synchronized electrocardiogram, arterial pulses and jugular venous waves.

Physical Findings of Simulator "K"

Respiratory sounds and observation of abdominal movement
Tracheal and bronchial breath sounds and abdominal movement are simulated to facilitate understanding of respiratory related phenomena such as Rivelo-Carvallo sign, respiratory splitting and timing of murmurs.

Group study
External speaker system produces heart sounds respectively at each auscultation site (aortic, pulmonic, tricuspid, and mitral). Useful for pre-training demonstration, group discussions and problem-based learning exercises.

Monitoring screen
Electrocardiogram (ECG), jugular venous pulse (JVP), carotid arterial pulse (CAP) and apex cardiogram (ACG)
Each chart can be freeze-framed for in-depth learning. Case explanation windows for self-directed learning are provided.
Cardiology Simulator "K" as a teaching aid

Compact and portable
Simple operation and maintenance
Standardized hands-on learning
Wide educational application: paramedics, cardiovascular nurses, medical students, physicians and cardiologist

An abundance of cases for richly varied teaching/learning programs

Auscultation
Heart sounds at four main sites.
(Carotid auscultation is possible in some relevant cases.)
Respiratory sounds: trachea and vesicular.

Simulator movements and palpation
Artery pulses: palpable at eight sites.
– bilateral carotid, brachial, radial and femoral arteries –
Venous wave: Jugular venous waves are visible at both sides of the neck.
Apex beat: palpable at three sites.
– right ventricle, left ventricle and dilated left ventricle –
Thrills (palpable murmurs): thrills can be perceived on the chest wall.

Dynamic graphs synchronized with cases
ECG interpretation in relation to real-time physical findings.
PCG and sphygmograms facilitate clearer understanding.

Configuration and customization
Combination of display items can be modified to fit teaching session and examination.
Sound volume and simulation speed can be controlled.

Built-in self learning aid
Explanation windows for each case help self-learning.

Effectiveness Performance reports attest to efficiency and satisfaction

Cardiologists:
After a thorough examination on the Simulator "K", all cardiologists surveyed arrived at the same bedside diagnosis, consistent with that of the source material.

518 trainees- medical students, nurses, physicians:
After finishing a 3 hour-training session, trainees showed significantly better scores than their pretest results.

Trainees & Students say
"Simulator"K" is so realistic, I felt as if I examined a real patient. I'd like to have another series of training courses with this cardiology patient simulator!
"I can concentrate on my auscultation and ECG study with the assistance of its perfect synchronization of heart sound and ECG display."


Learning aids

CD-ROM: English / Japanese
"How To Examine a Cardiology Patient, With Special Reference To The ECG"
Produced by JECCS (Japanese Educational Clinical Cardiology Society)
Supervision by Tsunekazu Takashina, Masaya Kino

TEXT BOOK:
Bedside Physical Examination
– learned by a New Cardiology Patient Simulator "K"
Edited, translated and supervised by Dr. T. Takashina
JECCS (Japanese Educational Clinical Cardiology Society)
36 basic cardiac cases, which are fully reproduced by simulator "K", are explained in detail.
* Four copies come with the simulator
Cases & Simulation Contents
Cardiology Patient Simulator “K” – Comprehensive patient simulation with sounds, pulses, apex and ECG

<table>
<thead>
<tr>
<th>No.</th>
<th>Normal heart simulation (12 cases)</th>
<th>Heart disease simulation (14 cases)</th>
<th>Arrhythmia (10 cases)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-01</td>
<td>S2 split (•) HR: 60</td>
<td>B-01 aortic stenosis</td>
<td>C-01 sinus arrhythmia</td>
</tr>
<tr>
<td>A-02</td>
<td>S1 split (+)</td>
<td>B-02 mitral regurgitation</td>
<td>C-02 sinus tachycardia</td>
</tr>
<tr>
<td>A-03</td>
<td>S2 split (+)</td>
<td>B-03 mitral stenosis</td>
<td>C-03 sinus bradycardia</td>
</tr>
<tr>
<td>A-04</td>
<td>S2 wide split</td>
<td>B-04 aortic regurgitation</td>
<td>C-04 ventricular prem. con. (1)</td>
</tr>
<tr>
<td>A-05</td>
<td>S3 gallop</td>
<td>B-05 hypertrophic cardiomyopathy</td>
<td>C-05 ventricular prem. con. (2)</td>
</tr>
<tr>
<td>A-06</td>
<td>S4 gallop</td>
<td>B-06 mitral sten-stenosis</td>
<td>C-06 ventricular prem. con. (3)</td>
</tr>
<tr>
<td>A-07</td>
<td>Pulmonic ejection sound</td>
<td>B-07 pulmonic valvular stenosis</td>
<td></td>
</tr>
<tr>
<td>A-08</td>
<td>S3 and S4 gallop</td>
<td>B-08 atrial septal defect</td>
<td>C-08 atrio-ventricular block</td>
</tr>
<tr>
<td>A-09</td>
<td>Innocent murmur</td>
<td>B-09 ventricular septal defect</td>
<td>C-09 atrial fibrillation</td>
</tr>
<tr>
<td>A-10</td>
<td>Midsystolic click sound</td>
<td>B-10 tricuspid regurgitation</td>
<td>C-10 atrial flutter</td>
</tr>
<tr>
<td>A-11</td>
<td>S2 split (•) HR: 72</td>
<td>B-11 acute mitral regurgitation</td>
<td></td>
</tr>
<tr>
<td>A-12</td>
<td>S2 split (•) HR: 84</td>
<td>B-12 patent ductus arteriosus</td>
<td></td>
</tr>
<tr>
<td>A-13</td>
<td>Mitrval valvular prolapse</td>
<td>B-13 mitral valvular prolapse</td>
<td></td>
</tr>
<tr>
<td>A-14</td>
<td>-</td>
<td>B-14 dilated cardiomyopathy</td>
<td></td>
</tr>
</tbody>
</table>

Normal jugular venous waves, arterial pulses and cardiac impulses are simulated, as well as heart sounds such as S2 splitting in the pulmonic area and S3 and S4 gallop sounds in the mitral area.

The characteristic findings of the arterial and venous pulse waves are simulated. For example, in ventricular premature contraction, the venous pulsations are normal but arterial pulsation is barely palpable by the premature beat.

Simulator K2: Arrhythmia simulation, auscultation training with ECG

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-01</td>
<td>B-01</td>
<td>C-01</td>
<td>D-01 vpc (quadrigeminy)</td>
</tr>
<tr>
<td>A-02</td>
<td>B-02</td>
<td>C-02</td>
<td>D-02 vpc (trigeminy)</td>
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<tr>
<td>A-03</td>
<td>B-03</td>
<td>C-03</td>
<td>D-03 vpc (bigeminy)</td>
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<tr>
<td>A-04</td>
<td>B-04</td>
<td>C-04</td>
<td>D-04 vpc (coupel)</td>
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<tr>
<td>A-05</td>
<td>B-05</td>
<td>C-05</td>
<td>D-05 vpc (repetitive)</td>
</tr>
<tr>
<td>A-06</td>
<td>B-06</td>
<td>C-06</td>
<td>D-06 vpc (R-on-T type)</td>
</tr>
<tr>
<td>A-07</td>
<td>B-07</td>
<td>C-07</td>
<td>D-07 non-sustained VT</td>
</tr>
<tr>
<td>A-08</td>
<td>B-08</td>
<td>C-08</td>
<td>D-08 vent tachycardia</td>
</tr>
<tr>
<td>A-09</td>
<td>B-09</td>
<td>C-09</td>
<td>D-09 vent flutter</td>
</tr>
<tr>
<td>A-10</td>
<td>B-10</td>
<td>C-10</td>
<td>D-10 vent fibrillation</td>
</tr>
<tr>
<td>A-11</td>
<td>B-11</td>
<td>C-11</td>
<td>D-11 vent R (sinus cond)</td>
</tr>
<tr>
<td>A-12</td>
<td>B-12</td>
<td>C-12</td>
<td>D-12 accel vent rhythm</td>
</tr>
<tr>
<td>A-13</td>
<td>B-13</td>
<td>C-13</td>
<td>D-13 agonal rhythm</td>
</tr>
</tbody>
</table>

Set includes:
- 1 Cardiology model unit
  - Manikin with base, 7 built-in speakers4 ch.
  - Vital signs system
    - Size: 65 x 97 x 27H cm approx. 10 kg
    - Packaging size: 109 x 84 x 40 cm 23.5 kg
- 1 Controller-cum-PC table
  - AC 120-240V, 50/60Hz
  - Size: 50 x 68 x 71H cm approx. 44 kg
  - Packaging size: 62 x 62 x 101 cm 59 kg
- 1 PC
  - Windows XP, 12ch. D/A PCI board, mouse, 112-ch. keyboard, 15" TFT monitor, software & data installed
  - Packing size: 59 x 59 x 40 cm

Optional and replacement parts
- Replacement pulse tube
  - 11256-061 carotid tube (black)
  - 11256-062 jugular tube (blue)
  - 11256-063 femoral tube (green)
  - 11256-064 radial tube (red)
  - 11256-065 brachial tube (yellow)
- 1 Rib sheet
  - Transparent vinyl
- 5 Replacement pulse tubes 5 variations, 1 piece each
- 4 Text books
  - A4, 102 pages
- 1 Amplifier
  - Size: 32 x 35 x 8H cm
  - Packaging size: 46 x 46 x 15 cm 10 kg
- 2 Speakers
  - Packaging size: 62 x 41 x 40 cm

Specifications are subject to change.

In addition to 36 patient simulations on the list above, the software allows in-depth study of ECG in various arrhythmias.

The full size graphic ECG is displayed to practice reading the waves using pause and/or calibrator functions.

Fifty-two pre-recorded cases are classified into 4 categories, comprised of 13 cases each.