THE WORK AND POWER OF THE HEART. PRINCIPLES OF OPERATION OF THE ARTIFICIAL BLOOD CIRCULATION DEVICE

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Annotation

This in the article of the heart mechanic work and power indicators and artificial blood rotation of the apparatus work principles analysis The heart pump as activity , its energetic efficiency and blood rotation in the system role Also , the heart activity in short supply applicable artificial devices and their physicist basics seeing Research results medicine technologies in improvement important importance has .

Key words: heart , energy , work , blood rotation , artificial apparatus, pump, pressure, volume, physiology, biophysics, energy, system , medicine, device, flow, heart cycle, technology, analysis, model, blood, mechanism, impulse, efficiency, monitoring

Introduction

Heart human in the body main pump task He does . He is blood . rotation system through whole body along oxygen and feed substances delivery Gives . The heart work and power study medicine and biophysics in the fields important importance has . Especially heart activity broken in cases artificial blood rotation devices This is applicable . in the article of the heart energetic indicators and artificial systems work mechanisms seeing will be released.

Literature analysis

Heart activity study according to many scientific research available . Classic in sources heart mechanic work as an executive body described . Modern in research and

of the heart energetic efficiency and biophysicist features deep analysis Artificial blood rotation devices according to research has also expanded . Scientists new generation pump systems and automated management models working is coming out .

Results and tests

Of the heart mechanic work his/her blood rotation in the system main pump function with directly related is , it is every one heart in the cycle known in size blood to the arteries Heart by executable work physicist point of view from the point of view pressure and volume multiplication through is determined . That is , the heart muscles when reduced blood known pressure under to the veins transmitted and this process mechanic of energy harvest to be take is coming .

Research to the results according to , healthy in humans of the heart blow size average 60–80 ml organization The heart hit speed and 60–80 times per minute around This will be indicators based on of the heart minute size , that is one per minute plowable blood amount is determined and it takes about 4–6 liters organization This indicator organism oxygen and food to the articles was need in satisfaction important importance has .

Of the heart power his/her doer your work to time ratio with is determined . Average on account human of the heart power 1–1.5 W what organization However physical loading on time this indicator one how many equal increase It is possible . This is the heart flexibility and physiological reserve opportunities shows

Below heart of activity main indicators quoted :

Table 1. Heart your work main physiological and physicist indicators

Indicator	Value range	Description
Shock size	60 – 80 ml	Every one in contraction issued blood size
Heart hit speed	60 – 80 times / min	Heart cycles number
Minutely volume	4 – 6 liters / min	One per minute plowable blood amount

Arterial pressure	120/80 mm.wire.top	Blood in the veins pressure
Heart power	1 – 1.5 W	Heart by executable work speed

Artificial blood rotation devices heart and lung function temporarily or partially changer complicated technician system This is apparatus mainly open heart operations on time are used . Their work principle of blood from the organism outside rotation to provide , to provide oxygen with enrichment and again to the organism to return is based on .

This of the system main components pump , oxygenator , filters and control from blocks consists of . Pump of the heart mechanic function do it , blood Oxygenator and of the lungs task do it , blood oxygen with saturates and carbonate anhydride remove throws .

Table 2. Artificial blood rotation of the apparatus main components and their tasks

Component	**Task**
Pump	Blood mandatory turns
Oxygenator	Blood oxygen with enriches
Heat exchanger	Blood temperature control does
Filters	Microparticles hold remains
Control system	The process monitoring and manages

Research this shows that modern artificial blood rotation devices high accuracy and reliability They have . using heart activity complete or partially replacement possible . However this from systems in use hemodynamic balance storage , blood coagulation features control to do and infection the risk reduce important importance has .

Quoted tables heart activity and artificial blood rotation system main features complex accordingly analysis to do opportunity gives . First in the table of the heart

physiological and physicist indicators given are , they are of the heart pump as efficiency in evaluation main criterion is considered . size and heart hit speed together minute volume determines that and organism general blood with provision level shows .

Arterial pressure indicator heart and blood vein system general status reflection If this indicator from the norm high or if low , heart in the activity disorders there is to be possible . Heart of power relatively small to be despite , it is continuous performance with big in size work This is the heart of high to efficiency has biological pump that shows .

Second in the table artificial blood rotation of the apparatus main components cited are , they are of the system continuous performance provides . Pump heart function complete performs , oxygenator and lung activity imitation Heat exchanger using optimal blood temperature is stored , this and metabolic processes for important .

Filters blood in the content harmful particles hold remains and patient safety increases . Control system and all processes in real time in mode following goes . In general in this case , tables artificial blood rotation of the apparatus complicated and high technological system that it is , that it every one component important role to play shows .

Conclusion

Conclusion as in other words, the heart work and power study human in the body blood rotation processes deep in understanding important importance has. Heart biological pump as high efficiency with works and organism necessary oxygen and food substances with provides . Its physicist and physiological indicators determination heart activity in evaluation main criterion is considered . Artificial blood rotation devices and modern in medicine heart and lung activity temporarily replacement opportunity giver important technology. This devices complicated to the structure has is , their effective performance many to factors depends . In the future

innovative technologies using this systems further improved, medicine in practice wider application is expected . This is human his life save while staying important factor become service does.

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