Cardiac Recovery Index

What exactly does the CRI mean and what’s the best way to evaluate an equine so the reading is accurate?

BY TROY “IKE” NELSON, DVM

THE GUIDELINES FOR JUDGING AERC Endurance Competitions (page 10) contain the following description of the Cardiac Recovery Index, which is also covered in a comparable manner in the AERC Rider Handbook (page 24):

The Cardiac Recovery Index: The ability of the horse’s circulatory system to accommodate the level of exertion experienced at the event is monitored by use of the Cardiac Recovery Index (CRI). The CRI may be performed at all control checkpoints at endurance rides, including the finish line control check.

The horse is not presented until it has met the recovery criteria established for that ride, usually 64 bpm or less. The horse is then presented to the control judge, and a resting heart rate is taken. Then the horse is trotted 125 feet out and 125 feet back. (The gait can be observed during the jog out for soundness and impulsion.) At exactly one minute from the time the horse started the 250 foot trot out, the heart rate is taken again. (For a horse that does not object to being handled, the control judge can initiate evaluation of the metabolic parameters during the remainder of the minute.)

A horse that is demonstrating adequate metabolic compensation should recover to the same resting heart rate taken before the 250 foot trot out, or preferably to a heart rate of four bpm less than the starting rate.

If the heart rate elevates during the CRI, the horse should be asked to return for a recheck CRI within 10-15 minutes to monitor for progressive recovery. The control judge should take a second look at all metabolic parameters at that time, including a second CRI.

The CRI is not necessarily used to eliminate a horse from competition; the entire clinical picture is used to assess the ability of a horse to continue in the event.

The CRI was developed back in the 1960s by Matthew Mackay-Smith, DVM, and popularized by Kerry Ridgway, DVM. Drs. Mackay-Smith and Ridgway are both in the AERC Hall of Fame. Dr. Ridgway also promoted the “fit to continue” criteria that has become the AERC and global standard for endurance riding. The CRI, previously also known as the "Ridgway Trot," was, and is, an objective way to monitor the progressive recovery of a horse during or after a ride. Some riders and even some control judges see this as a "magic number" that means either your horse is OK or your horse gets pulled.

We all need to remember that the CRI is just one piece of the puzzle, and needs to be considered in the metabolic picture and in respect to ambient temperature and humidity, before deciding whether to pull a horse or let it continue.

Therefore the CRI is very useful at the finish and during the best condition judging, but can be a good tool to use throughout the ride. If done correctly it should not slow up the process at the control checkpoint. When judging, I start at the nose and check the membranes, refills, and skin tent and then progress to muscle tone, soreness of back, withers, or girth area on the near side. Next comes a check of anal tone and then the off side muscle, back, withers and girth. As I am coming back around I am looking for wounds or interference lesions on the off and then the near side.

I then take the pulse rate and have the owner trot the horse (which lets me evaluate the gait and impulsion). If my distance is correct for the CRI (125 feet) then once the horse is back I have about 30 seconds to evaluate the gut sounds which can be done for a horse that does not object to being handled. By starting on the off side I end on the near side, ready to take the second pulse rate. Using this method allows me to have the CRI as one of my tools for each control checkpoint.

A few things are important to make the CRI the valuable tool it can be. The trot out distance needs to be pretty accurate. If you walk off 45 steps that should be about 125 feet. Level ground also helps if possible. If your distance is correct you should have 30 to 35 seconds to evaluate gut sounds (or other parameters) before taking the second heart rate. Gut sounds are a good thing to check as it usually does not elicit any apprehension from the horse and therefore should not affect heart rate.

Be sure to take the first heart rate yourself (i.e., do not use the pulse from the pulse area). If the heart rate elevates by 4 bpm but the first heart rate was below 60 you may or may not need to do a recheck—that depends on the other parameters.

A 4 bpm increase when the first heart rate was 60 or greater, or an 8 bpm increase with a first heart rate less than 60, should automatically trigger a recheck in 10 minutes or so. Any horse with a first heart rate of 60 or over that has an increase of 8 bpm is not recovering as well as it should. This horse should be scrutinized very closely as it may well require treatment for metabolic issues.

The CRI is not the be-all and end-all but can certainly be a very valuable tool for assessing recovery in the endurance athlete. Learn to use it and make it part of your arsenal for evaluating how the horse is doing. Your contribution to horse welfare will be much improved!

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The Cardiac Recovery Index in Research

The importance of this index, which is the difference between the resting heart rate (HRR) and the heart rate after 1 minute (HRR) is apparent from a study1 that had monitored 489 horses in 12 [75 or 100 mile] rides and found that elimination rates were significantly higher in horses with HRR,≥60/minute compared to horses with HRR,<60.

A high CRI (HRR-HRR,≥4) led to greater disqualification rates when HRR was more than 60 beats/minute.

Another more recent study2 of 3,493 horses (14,490 veterinary examinations) showed that—especially during the second half of the ride—increases in heart rate and CRI were associated with increased risk of metabolic elimination.

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