

Neuropathic Hydrocephaly – Information for Cow-Calf Producers

Dr. Scott Greiner

Extension Animal Scientist, VA Tech

Neuropathic Hydrocephaly (NH) is a genetic defect recently recognized in Angus cattle. NH-affected calves are dead at birth and have severe hydrocephalus (water on brain), skull malformation, absence of central nervous system tissue (brain and spinal cord), and joint fixation. Research has confirmed that NH is a lethal genetic defect which is inherited as a simple recessive and controlled by a single gene. Therefore, for a calf to be affected, it must inherit the NH allele from both of its parents. Another lethal genetic recessive, Arthrogyrosis Multiplex (AM, aka curly calf), was discovered last fall. However, it is important to understand that NH and AM are caused by different genes and the conditions associated with each defect are distinctly different.

As with AM, the discovery of NH warrants consideration by cow-calf producers as to its potential impact on their herds. The chances of having an NH calf are directly related to the probability of herd sires and cows being carriers of the NH allele. It has been documented that the NH mutation first occurred in Angus sire GAR Precision 1680. Therefore, animals with this sire in their pedigree potentially could be carriers of NH. Very recently, the American Angus Association announced the release of a DNA test which can be utilized by the industry to determine if individual animals are free of the NH gene (NHF) or carriers of the defect (NHC). The majority of Angus AI sires have been DNA tested, and these test results made public through the American Angus Association web site (www.angus.org). Utilizing this information on AI sires, commercial cow-calf producers can do a simple risk assessment for their herd. For example, sons of a known carrier (NHC) bull have a 50% chance of being carriers. Daughters of these bulls 25% chance of being carriers (grandprogeny of known carriers have 25% chance of being carriers). Using this approach, producers can get a feel for the potential frequency of the AM gene in their cowherds based on the ancestry of recent sires used in the herd. Herds which have used known carrier bulls AI, or sons of known carrier bulls, have a higher probability of carrier females within the cow herd. Commercial producers are encouraged to consult with their seedstock suppliers to assist them in evaluating pedigrees of their herd sires and the potential risk within their herds.

The simplest and surest way to alleviate the risk of having an NH calf is to use only sires which are known to be free of the NH gene (NHF). With the breeding season in full swing, and the very recent availability of the commercial DNA test, there is limited opportunity to make significant changes this breeding season. In the very near future (ie. upcoming bull sales), DNA genotypes will be available and bull-buyers will be able to make informed decisions as they purchase new herd sires. Additionally, with DNA genotyping now available at a cost of ~\$25 per animal, commercial producers can genotype their current bull battery to alleviate any guesswork associated with knowing the status of their sires for genetic defects and make decisions on future use of these sires accordingly.

Although NH originated in Angus cattle, animals of other breeds which have Angus genetics in their pedigree may also be at risk of being carriers. For example, Gelbvieh Balancer and SimAngus genetics in commercial herds also need to be evaluated as to their NH status due to their Angus ancestry.

For most commercial cattlemen, NH will likely not be a significant issue. However, risk assessment based on pedigree information and testing of current herd sires (if warranted based on pedigree risk) provide a practical means for commercial producers to address this issue.

Additional information on NH as well as AM, including a list of known carrier sires and details on testing procedures and laboratories can be found on the American Angus Association web site www.angus.org.