

-----Original Message-----

From: DiCicco, Emiliano
Sent: Sat 5/21/2016 9:00 PM
To: Miller-Saunders, Kristi
Subject: I: HSMI diagnoses in BC

Hi... look at the following... [redacted]

[redacted]

I look forward to reading Hugh's reply, though...

Talk you soon,

Emiliano

Emiliano Di Cicco DVM PhD
Fish Health Researcher
Molecular Genetics Lab - Pacific Biological Station Department of Fisheries and Oceans, Canada
3190 Hammond Bay Rd, Nanaimo, BC V9T 1K6 - Canada
Phone: office (250) 756 7045
Cell [redacted]
e-mail: Emiliano.DiCicco@dfo-mpo.gc.ca

s.19(1)
s.21(1)(a)
s.21(1)(b)

-----Messaggio originale-----

Da: Marty, Gary D AGRI:EX [mailto:Gary.Marty@gov.bc.ca]
Inviato: sab 21/05/2016 12.36
A: DiCicco, Emiliano; 'ferguson@fishpathology.com'
Oggetto: HSMI diagnoses in BC

Hi Hugh and Emiliano,

It was nice to see you at the meeting on Wednesday. I appreciate that conflict is a part of science. In this case, some additional information might help clarify some things.

In particular, I want to clarify how HSMI has been defined in BC since I began working in my current position in 2004. It was not long after I started that I began seeing occasional fish with epicarditis, endocarditis, and variable amounts of myocardial necrosis. When I first diagnosed those cases, I provided a general comment that these lesions were

consistent with systemic disease. In February 2008, [REDACTED] provided BC vets a continuing education session that summarized the pathology of emerging European diseases in farmed Atlantic salmon. When she showed images of HSMI, I immediately recognized the lesions as similar to what I had been seeing microscopically in some BC fish. However, the aquaculture veterinarians said that they were not seeing a clinical pattern that was consistent with Norwegian HSMI (all the Atlantic salmon companies have Norwegian connections, so I assume that they are well aware of the clinical signs of HSMI). Therefore, we decided that what I was seeing was probably not the same as Norwegian HSMI. We understood HSMI to be the name of a disease syndrome, and that characteristic clinical signs were needed for a diagnosis of HSMI (i.e., similar morphologic lesions without clinical signs did not warrant a diagnosis of HSMI). After that session, when I saw inflammatory heart lesions that were similar to HSMI, I started adding to my comments a note that the lesions were similar to lesions in Norwegian fish with HSMI, but that HSMI had never been seen in BC.

The expert report that I produced in an ongoing Canadian legal case provides a good example:

Public reporting: Affidavit of Dr. Gary D. Marty sworn October 30, 2013, in Morton v. Minister of Fisheries and Oceans et al, Federal Court No. T-789-13

21. Have you tested fish for PRV and/or HSMI with results that contradict the results of your testing for MHC?

I have not tested fish for PRV and/or HSMI with results that contradict the results of my testing for MHC, but I have tested fish in which the suite of lesions was different than the groups of fish I examined from MHC or DFO.

As described in my answer to question #4, among all the testing I have done for HSMI (e.g., the BC Fish Health Auditing and Surveillance Program), I occasionally diagnose "unexplained heart lesions" as the cause of death. However, the prevalence of PRV in tested cases (80%) is the same as the prevalence of PRV among (i) groups of fish that die of other causes and (ii) healthy fish that are sampled for pretransfer screening.

In two cases submitted directly by a BC fish farm company other than Marine Harvest (one case in 2011 and one case from a different farm in 2013), I diagnosed unexplained heart lesions as the cause of death in all of the fish in the sample group. These cases were not tested for PRV, but based on other data there is an 80% chance that they would be PRV positive. In this year's case, I requested a second submission that included skeletal muscle for histopathology (skeletal muscle is not included in routine submissions for diagnostic purposes). One of the 10 fish included in the second submission had severe heart lesions but no skeletal muscle inflammation; therefore, this fish did not have HSMI. Three other fish had moderate to severe heart lesions along with mild inflammation of skeletal muscle; therefore, these fish had inflammation of the heart and skeletal muscle, which are two features of HSMI. However, the farm's veterinarian told me that the fish did not have clinical signs consistent with the description of the European syndrome HSMI (see Dr. Nylund's expert report, answer to his question 24). Because these BC fish did not have all features of the European syndrome HSMI (i.e., clinical features are different), it is not appropriate to diagnose HSMI in these fish. Without consistent clinical signs, a diagnosis of HSMI in these fish is likely to result another example of the diagnostic "confusion" described by Dr. Nylund in his expert report (i.e., the response to his question 22). The submission form submitted with the second BC sample included a history that stated, "As environmental conditions improved, mortality

dropped significantly. Mortality is now low normal with no clinical signs of disease." The cause of the heart lesions in these fish remains unknown, but all the information I have better fits "transient adverse environmental conditions" (e.g., exposure to algal toxins) as the cause of disease rather than PRV. Also, if BC strains of PRV were causing HSMI, it is not plausible to have 80% of BC Atlantic salmon infected with PRV every year since 2006, but have only two cases of HSMI during that same period.

This expert report was entered into evidence and is available to the public. In the 2.5 years since I produced this document, I have not seen any information that compels me to change my response to this question (# 21). After our meeting on Wednesday, [REDACTED] informed me that the 2011 and 2013 cases in my expert report [REDACTED]

I think that the information above supports the conclusion that I diagnose inflammation in the heart and skeletal muscle when it occurs; however, I do not diagnose HSMI in these fish because the submitting veterinarians tell me that their fish do not have clinical signs consistent with HSMI. As a referral veterinarian, I would need some very strong justification to diagnose a syndrome contrary to the information provided by my referring veterinarians.

To summarize, I provided information in a public document 2.5 years ago that stated, "these fish had inflammation of the heart and skeletal muscle, which are two features of HSMI". My understanding from our meeting on Wednesday is that we do not disagree on these two features of HSMI. My understanding is that the fish I examined and the fish you examined were from the same farm and from the same outbreak. I reported "inflammation of the heart and skeletal muscle" publicly in 2013. Your findings of the same lesions from the same outbreak were reported yesterday (2.5 years later). [REDACTED] when I read things like the following in a CBC news report (emphasis mine):

"A feared viral disease proven deadly in Norwegian fish farms has been confirmed for the first time by federal scientists studying farmed salmon in B.C.

Heart and Skeletal Muscle Inflammation (HSMI) has been linked to the deaths of up to 20 per cent at some Norwegian farms.

'The concern is that it is a disease that hasn't previously been detected in B.C. and at the present time we really don't have sufficient evidence to know if it causes mortality or is a production issue here,' said Kristi Miller, part of a team of federal scientists studying farmed fish samples from sites along the B.C. coast."

<http://www.cbc.ca/news/canada/british-columbia/farmed-salmon-bc-disease-hsmi-aquaculture-1.3593958>

Best regards,

s.19(1)
s.20(1)(b)

Gary

P.S. In my experience, reporters will make changes to stories if errors are pointed out quickly. I recognize that the information I highlight from the CBC story was not included in the press release, and that it might have been influenced by discussions with other people (e.g., [REDACTED]).

Gary D. Marty, D.V.M., Ph.D., Diplomate, A.C.V.P.

Senior Fish Pathologist
Animal Health Centre
Ministry of Agriculture
1767 Angus Campbell Rd.
Abbotsford, BC, V3G 2M3
604-556-3123

s.19(1)