Syllabus

SPP symposium – COVID-19 and the placenta

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Disclosures

Dr. Goldstein has nothing to disclose.

What lesions are more common or characteristic of placentas after SARS-CoV-2 infection in pregnancy?

Selected review of the literature:

Cite	N	Controls	Associations
Baergen	20	Implicit	FVM features in 10 of 20
Shanes	16	Historical	DA (OR 5.4), DVM (OR 8.3), IVT (OR 7.3)
Hecht	19	GBS, HIE	None
Smithgall	51	Consecutive	VAG (OR ~5), SCT (OR inf)
Zhang	74	Consecutive	None
DA: Decidual arteriopathy; DVM: Delayed villous maturation; FVM: Fetal vascular malperfusion; IVT: Intervillous thrombus; SCT: subchorionic thrombus; VAG: villous agglutination			

Our solution -> Contemporary controls, GA matched, randomly selected at the time of delivery. N = 107 and counting with 58 controls

Placental finding	Placentas with this finding	OR (covid vs. non)	P
Decidual arteropathy	43	3.8	0.003
Maternal vascular malperfusion and associated lesions	63	2.3	0.02
Disorders of increased villous vascularity	23	4.2	0.03
Mural hypertrophy of maternal arteries	26	3.5	0.03
Chronic deciduitis with plasma cells	22	3.9	0.03

What did we find – DA is still increased, although atherosis & fibrinoid necrosis is no longer significant. OR is lower but not so low as to constitute a miss. N.b. the original 16 cases are still part of this mix, which would bias us toward agreeing with ourselves. Disorders of increased villous vascularity = chorangiosis (n=6) and increased villous capillaries (n=17) not meeting the threshold of chorangiosis. CDPC is surprising.

In patients with SARS-CoV-2, what features are associated with placental findings?

First let's examine a wide variety of variables.

Placental finding	Placentas with this finding	Explanatory variable	Number or Mean +/- stdev of EV	OR	P
Accelerated villous maturation	8	Preeclampsia	9	57	1.2e-4
Acute inflammatory response (MIR or FIR)	13	WBC max	12 +/- 5.1	1.3	5.6e-4
Accelerated villous maturation	11	Apgar, 5 min	8.700935	7.6	6e-4
Maternal inflammatory response (any)	12	WBC max	12 +/- 5.1	1.3	6.7e-4
Maternal inflammatory response stage 2	10	WBC max	12 +/- 5.1	1.3	7.9e-4
Fetal inflammatory response stage 2	4	Clinical chorio	5	128	1e-3

In placentas with SARS-CoV-2, typical placental physiology still reigns – preeclampsia is associated with accelerated villous maturation, clinical chorioamnionitis and elevated white blood cell counts are still associated with acute placental inflammation. The association of accelerated villous maturation with increasing 5 minute Apgar is difficult to parse.

Is there a difference between symptomatic and asymptomatic covid? Smithgall examined this and said, “No.”. What do we find?

Placental finding	Placentas with this finding	Explanatory variable	Number pts with EV	OR	P
Accelerated villous maturation	9	Fever	16	21	2e-3
Accelerated villous maturation	9	LRI	11	12	3e-3
Accelerated villous maturation	9	myalgia/fatigue	10	9.5	9e-3
Chronic deciduitis with plasma cells	10	GI sx	5	14	0.01
Clustered avascular villi	18	myalgia/fatigue	10	6.2	0.011
Clustered avascular villi	18	Fever	16	4.5	0.014
Maternal vascular malperfusion	4	Fever	16	13	0.034

If we look at individual COVID symptoms, Fever, lower respiratory infection symptoms (LRI), myalgia or fatigue, and gastrointestinal (GI) symptoms show associations albeit with low N sizes (med students need to fill in more blanks). Notes – “mixed messages” – Fever is associated with accelerated maturation (a feature of MVM), topline diagnosis of MVM, and avascular villi (an FVM feature). Another note – “Any symptom” does not carry the same effects. Probably because URI is very common (n = 22) and not associated with anything. Also, diagnosis to delivery time in symptomatic patients does not show any effect, again likely due to low numbers.

Discussion / Conclusion

We continue with similar findings. We find decidual arteriopathy is associated with SARS-CoV-2 infection. However, we no longer see increased rates of intervillous thrombi in our SARS-CoV-2 cohort.

Among patients with SARS-CoV-2, symptomatic infection, particularly fever and myalgia/fatigue were associated with accelerated villous maturation and avascular villi. These findings cross major categories of Amsterdam criteria (MVM and FVM, respectively), reflecting either their spurious nature or divergent pathophysiology.

Investigation into long-term outcomes and comparison with other respiratory viruses is needed for context.

Bibliography

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