

# A case of high HDL-cholesterol

<b>HOSP #</b>		<b>WARD</b>	GP Clinic
<b>CONSULTANT</b>	John Stanfliet / Jody Rusch	<b>DOB/AGE</b>	73 year Female

## Abnormal Result

Abnormal lipid profile (see below)

## Presenting Complaint

A 73 year old female was investigated with a full lipid profile after presenting with an increased total cholesterol upon routine screening at her general practitioner.

## History

The patient had an increased Total Cholesterol, but was otherwise not unwell. Medication history unfortunately not available.

## Examination

Not available

## Laboratory Investigations

<b>Test</b>	<b>Result</b>
Urea	7.2 mmol/L
Creatinine	105 umol/L
eGFR	46 ml/min/1.73m2

Fasting Lipid profile (lipemia index - turbidity- on sample was absent):	
Total Cholesterol	6.7 mmol/L
Triglyceride	0.6 mmol/L
HDL Cholesterol	> 4.7 mmol/L
Non-HDL Cholesterol (calculated)	< 2.0 mmol/L
LDL Cholesterol (calculated)	< 1.7 mmol/L
LDL Cholesterol (direct – measured)	1.3 mmol/L
Glucose Fasting	5.5 mmol/L

Table 1 – Full lipogram with other routine chemistry tests.

## Other Investigations

To rule out the possibility of interferents, the following tests were performed.

Test	Value
Apo A1	4.24 g/L (424 mg/dL) (Ref. >140 mg/dL)
Apo B	0.52 g/L (52 mg/dL) (Ref. < 130 mg/dL)
Apo B : Apo A1 ratio (calculated)	0.12

Table 2 – ApoA1 and ApoB by immunoassay. ApoA1: the major lipoprotein in HDL particles. ApoB: the major lipoprotein in Non-HDL particles.

## Final Diagnosis

Increased HDL which may likely be an APOC3 deficiency.

# Take Home Message

Although not present in this case, elevated apolipoprotein B (ApoB) confers increased risk of atherosclerotic cardiovascular disease, even in a context of acceptable LDL cholesterol concentrations. Extremely low values of ApoB (<48 mg/dL) are usually related to malabsorption of food lipids and can lead to polyneuropathy. Reduced apolipoprotein A1 (ApoA1) confers an increased risk of coronary artery disease. Extremely low ApoA1 (<20 mg/dL) is suggestive of liver disease or a genetic disorder. Elevated ApoB:ApoA1 ratio confers increased risk of atherosclerotic cardiovascular disease, independently of LDL and HDL cholesterol concentrations.

If the inverse of the above is true, then this lady is likely destined to live forever, but that's the whole conundrum in lipid metabolism – the inverse of one's theories does not always hold true under randomized controlled studies, and due to the difficulty of finding a proper control group. It was however previously demonstrated that patients with ApoC3 deficiency (if this is the cause in this case) increases longevity.

*APOC3 has been established as an inhibitor for lipoprotein lipase, a gene that hydrolyzes triglycerides to generate free fatty acids before their uptake by muscle and adipose tissue (reviewed in Jong et al). Mice with a high-level expression of human APOC3 on a background of Ldlr deficiency proved to be an excellent model for familial combined hyperlipidemia, because they are disturbed in the breakdown of triglycerides. In contrast, mice lacking Apoc3 show increased activity of LPL, which causes hypotriglyceridemia and protection from postprandial hypertriglyceridemia. From these mice studies, it became clear that a deficiency of APOC3 could cause a healthier lipoprotein profile, which is associated with protection from cardiovascular diseases. However, in the absence of APOC3-deficient subjects, this*

*hypothesis was difficult to test directly.*

*Dodacki, A., Wortman, M., Saubaméa, B. et al. Expression and function of Abcg4 in the mouse blood-brain barrier: role in restricting the brain entry of amyloid- $\beta$  peptide. Sci Rep 7, 13393 (2017). <https://doi.org/10.1038/s41598-017-13750-0>*

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# A case of severe hypoalbuminaemia

<b>HOSP #</b>	Lab no: SA03948371	<b>WARD</b>	Paediatric Ward
<b>CONSULTANT</b>	Dr. Jody Rusch	<b>DOB/AGE</b>	16 y Female

## Abnormal Result

Albumin of 8 g/L

## Presenting Complaint

Signs and symptoms of a urinary tract infection made the patient present to a general practitioner.

## History

No known chronic medical illness were present upon initial presentation.

No medical treatment was being taken for chronic illnesses.

The patient had reported taking NSAIDS before for pain in the

lower abdomen. The exact drug / dose was unknown.

## **Examination**

All clinical findings are unfortunately not available for this patient.

It is known that the patient had been having lower abdominal pains upon presentation (which was not due to pregnancy).

A urinary tract infection was suspected by the initial treating physician. Upon the other finding of edema, investigation towards the cause was investigated.

Typical findings of nephritic syndrome are:

- Fever
- Edema (due to hypoproteinemia)
- High blood pressure (due to activation of the renin-angiotensin-aldosterone system).
- Joint pain
- Muscle pain
- Malar rash
- Foamy urine (proteinuria)

## **Laboratory Investigations**

Albumin 14 g/L

Cholesterol 8.14 mmol/L

Urine Protein:Creatinine ratio: 1.62 g/mmol creat

C3: 0.29 (Low)

C4: 0.07 (Low)

Creatinine 255 – 322 umol/L

# Other Investigations

Test Item	15/07/2020 18:44	15/07/2020 14:56	15/07/2020 10:09	14/07/2020 13:07	14/07/2020 12:59	14/07/2020 04:17	14/07/2020 03:34	14/07/2020 02:37	06/07/2020 20:19	19/06/2020 11:43	19/06/2020 11:13	18/06/2020 14:48	18/06/2020 13:14	17/06/2020 14:37	17/06/2020 09:19	15/06/2020 17:37	15/06/2020 17:17	15/06/2020 13:52
Hb	• 127			136				137	132 L		129 L	131 L			130 L		131 L	130 L
H	••• 5.9 H			4.2				INTE	3.2 L		4.6	4.7			4.8		4.4	4.7
Cl									96 L									
Urea	• 15.6 H			14.9 H				13.1 H	16.2 H		27.7 H	26.9 H			26.1 H		29.2 H	28.9 H
Creat	• 322 H			322 H				279 H	295 H		304 H	294 H			275 H		255 H	255 H
Comment	• CM-			CM-				CM-	CM-		CM-	CM-			CM-		CM-	CM-
HbA1c (NGSP)																		
HbA1c (IFCC)																		
Est. wbc glc																		
Comment																		
Ca	• 1.93 L			1.82 L					1.82 L		1.77 L							
Mg	••• 0.97 H			0.71					0.64		0.67							
Phos	••• 2.79 H			1.88					1.17		1.88 H							
Total prot																		
Alb	•• 8 L																	
Total billi	• 4 L			5														
Conj billi	INTE			8+ 4 H														
ALT	• 64 H			6+ 46 H														
AST	INTE			8+ 72 H														
ALP	• 80			8+ 72														
GGT	• 22 H			22 H														
LD	INTE			8+ 877 H														
CRP																		
Total chol																		
Comment																		
CRP									425 H									
Kapto				5.59 H														
C3				8+ 0.58 L														
C4				8+ 0.24														
Iron																		CEGK CEGK

# Final Diagnosis

Lupus Nephritis with hypoalbuminemia

# Take Home Message

The clinical presentation of this patient is a good example of the findings in patients who initially present with renal failure. The extent of renal failure is often so severe, that when the patient presents with signs and symptoms of renal failure, there are quite significant permanent renal damage already.

Patients with nephrotic syndrome present with significant proteinuria with resultant hypoproteinemia, firstly hypoalbuminemia, followed by the other bigger proteins like gammaglobulins, alpha-1, beta-1 and beta-2 (complement) proteins. Because alpha-2 (macroglobulin) comprises one of the biggest proteins (in molecular size) in the serum, it generally stays in the serum relatively longer than the other

leaking proteins.

Because the liver increases its production of proteins to try compensate for the reduction in osmolality, the production of VLDL rises significantly and hence Triglycerides (and cholesterol) rises. Thus cholesterol in this patient measured 8.14 mmol/L.

The pathophysiology of lupus nephritis is that of autoimmunity. Autoantibodies direct themselves against nuclear elements. The characteristics of nephritogenic autoantibodies are antigen specificity directed at the nucleosome. High affinity autoantibodies form intravascular immune complexes, and autoantibodies of certain isotypes activate complement. Hence the C3 and C4 which are low often indicates active lupus disease.

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## **Elevated anti-Thyroglobulin Antibodies**

<b>HOSP #</b>		<b>WARD</b>	Oudtshoorn Clinic
<b>CONSULTANT</b>	George van der Watt & David Marais	<b>DOB/AGE</b>	66y Male

## **Abnormal Result**

Medical Validation : XJ (Authorise By Episode)

Option Mode Inquire Function Test Set Audit Partial Print Help

Episode No XJ MRN MIBN60160131 Lab Oudtshoorn Laboratory Visit Test Sets  
 M 66 y 22/04/1952 Routine [A]ATGA #

Clotted blood; Routine  
 F.N. Alt RN ABRB4060P Collection 02/10/2018 11:55  
 Hos Oudtshoorn Clinic wc OBB 044 272 7682 Received 02/10/2018 13:55  
 Wrd Ward not stated Registered 02/10/2018 15:03  
 Doc SR BRINKHUIS ePR Detail

Test Set	Staff Notes	Test Item	Result	Units	Normal Values	Previous Result 1	Previous Result 2	Previous Result 3	Previous Result 4	Previous Result 5
ATGA		Anti-thyroglobulin Ab	1,944	U/mL	<115					
		ATGA clinician alert								

## Presenting Complaint

Mr. X, a 66 year old male, complained of chest pain, was seen at the Oudtshoorn Emergency department and a myocardial infarction was excluded by three serial point-of-care (POC) Troponin I results.

## History

- Known with hypothyroidism, but the cause was not defined yet.
- On Eltroxin 150 ug daily PO
- No other treatment.
- Various stool analyses had been sent in for culture, with no definitive result.

## Examination

Unfortunately not known.

## Laboratory Investigations

Free T4: 24.6 pmol/L (7.6 – 16.1 pmol/L)

Anti-Thyroglobulin Antibody levels were elevated at **1944 U/mL** (ref. <115 U/mL).

# Other Investigations

Later, by retrospective viewing of the patient's results it was revealed:

Total Cholesterol (TC) was elevated at 7.6 mmol/L. Hypothyroidism is associated with hypercholesterolemia. It can be concluded by the retrospective overview of results that upon an episode of hypothyroidism, the patient had hypercholesterolemia. This was most likely due to cessation of Thyroxine treatment, to whatever reason.

Test Item	15/04/2019 17:38	11/01/2019 17:44	31/10/2018 18:32	31/10/2018 00:24	30/10/2018 17:21	02/10/2018 15:03	03/09/2018 15:13	31/08/2018 18:19	23/02/2018 14:30
Comment									
Total chol	7,55							3,78	
Comment	CHOLC2							CHOLC2	
CRP								1	
Total PSA									
CEA									
Comment									
TSH	δ+25,53 H	δ+ 1,34			<.01 L			<.01 L	<.01 L
Free T4	δ- <3.2 L	δ- 8,9			δ- 15,9	δ- 24,6 H	34,3 H		27,6 H
Free T3							8,9 H		
Anti-thyrogl Ab						1944 H			

Index sample marked by the yellow shade. TC result which is raised (upper left corner) corresponds to the severely hypothyroid episode as revealed by the low T4 on that same sample.

Investigations also confirmatory for auto-immune hypothyroidism are:

- Anti-Thyroid peroxidase antibodies
- Anti-TSH receptor antibodies

# Final Diagnosis

Auto-immune hypothyroidism

# Take Home Messages

*Interestingly, numerous patients with hypothyroidism is diagnosed at our Lipid Clinic at Groote Schuur Hospital. Patients are being referred for hypercholesterolaemia. Generally referral to this clinic happens when TC > 7.5 mmol/L. These patients are referred as presumed to have familial hypercholesterolaemia, but upon further work-up it is found that many of these patients have long-standing untreated hypothyroidism.*

Prevalences of antithyroid antibodies as summarized by Up-to-date:

