

Lipid Profile and hs-CRP in Hypothyroidism: Before and After Thyroxine Therapy

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Abstract

Background: Hypothyroidism is the most common thyroid disorder in India. Overt hypothyroidism (OH) is characterized by highly increased levels of TSH and low levels of free thyroid hormones (FT3 and FT4). Hypothyroidism can lead to low-grade inflammation through various mechanisms, including altered metabolism, obesity, its autoimmune nature leading to persistent altered immune response, and the release of pro-inflammatory cytokines. High-sensitivity C-reactive protein (hs-CRP), a marker of systemic inflammation, is now considered a strong predictor of future cardiovascular events. Limited and conflicting data exist regarding lipid parameters and inflammatory status in overt hypothyroidism after restoration of euthyroidism. The present study was conducted to evaluate lipid profile and hs-CRP as cvd risk markers in women with overt hypothyroidism, and to assess their changes following thyroxine therapy.

Material and Methods: The present study as a part of Ph.D. work, was conducted in the Department of Biochemistry, GMC, Chh. Sambhajinagar during period 2012-2014. The study consists of total 100 women belonging to the age group 18-45 years. Group-I(cases): 50 newly diagnosed and untreated women with overt hypothyroidism, who were advised to start thyroxine therapy. Group-II (controls): Euthyroid healthy women volunteers. Lipid parameters- total cholesterol, LDL cholesterol, HDL cholesterol, triglyceride (TG), and hs-crp were evaluated in cases (Group-I) and controls (Group -II) and compared at baseline. Group-I, OH cases were followed-up for 12 weeks after initiating thyroxine therapy (given by the treating physician as a part of routine care). Lipid parameters, and hs-crp were reevaluated after restoration of euthyroidism, and compared before therapy and after therapy.

Results: At baseline, mean serum levels of total cholesterol (216.43 ± 20.61 mg/dl Vs 175.6 ± 9.13 mg/dl), LDL cholesterol (141.44 ± 24.96 mg/dl Vs 106.4 ± 21.76 mg/dl), triglyceride (152.15 ± 16.33 mg/dl Vs 112.7 ± 21.39 mg/dl), and hs-CRP (2.76 ± 0.69 μ g/ml Vs 1.97 ± 0.55 μ g/ml) were significantly elevated in OH group compared to control group ($p < 0.0001$). Whereas, mean HDL cholesterol was slightly reduced OH group compared to control group, but the difference was not statistically significant ($p > 0.05$).

TSH showed a significant positive correlation ($p < 0.001$) with total cholesterol, LDL-C, TG and a significant negative correlation with HDL-C ($p < 0.001$) in overt hypothyroidism. Similarly, a significant positive correlation was observed between TSH and hs-CRP in overt hypothyroidism. These findings suggest that overt hypothyroidism is associated with dyslipidemia and chronic low -grade inflammation, which may contribute to an increased risk of cardiovascular disease (CVD) in these patients.

After thyroxine therapy and on restoration of euthyroidism, a statistically significant decrease ($p < 0.0001$) was observed in the mean values of total cholesterol (216.43 ± 20.61 mg/dl to 197.57 ± 14.48 mg/dl), LDL-C (141.44 ± 24.96 mg/dl to 122.09 ± 19.80 mg/dl), and triglycerides (152.15 ± 16.33 mg/dl to 143.48 ± 10.32 mg/dl). While HDL cholesterol levels increased significantly (44.55 ± 10.20 mg/dl to 46.78 ± 9.01 mg/dl) in OH group after thyroxine therapy as compared to those before therapy. Mean hs-CRP levels also showed a significant reduction in OH group after thyroxine therapy compared to before therapy (2.76 ± 0.69 μ g/ml to 2.44 ± 0.57 μ g/ml). These findings suggest that, thyroxine therapy significantly improves lipid parameters and reduces inflammation, thereby reducing the risk of CVD in these patients.

Conclusion: Finally, we conclude that, in addition to the standard lipid parameters, early screening for hs-CRP levels in newly diagnosed women with overt hypothyroidism may aid in appropriate treatment, potentially reducing future cardiovascular complications and enhancing the overall quality of life in these patients.