Reviewing the Relationship between Cholesterol and Suicide

May 15, 2013

Statement of the Problem

Identifying biological markers that may provide insight into suicide risk is highly valued and needed. Is there a relationship between cholesterol and suicide risk?

Summary of the relevant literature

Research looking at cholesterol and its relationship to suicide stemmed from the increase in suicide and injures following the use of a cholesterol lowering drug (Penttinen et al. 1995; Hibbeln, et al. 1996). Since then numerous studies have evaluated this relationship, and mixed results have been reported.

Early studies surrounding the initial observation found supporting evidence that there is a relationship between suicide and cholesterol. With a few exceptions (Chang et al. 2012; Brunner et al. 2002), the majority of the studies has found that lower, as compared to higher, cholesterol is significantly associated with increased suicidality (Sarchiapone et al., 2001; Atmaca et al. 2002; Sullivan et al. 1994). More specifically, a link between depression, lower cholesterol, and suicide was found. This relationship was initially found by Sullivan and colleagues who looked at 90 men and women and discovered that those with depression and lower cholesterol levels had an increased risk of suicide, compared to those with depression and average cholesterol levels (1994). Multiple studies since then have supported this relationship (Kunugi et al., 1997; Papassotriopoulos et al., 1999; Rabe-Jablonka et al., 2000; Kim et al., 2004; Ruljancic et al., 2011). More recently, Olie and colleagues were able to corroborate this finding as well as gain insight into possible gender differences. Their study revealed that the risk of suicide attempts increased 15.6 fold in women with lower cholesterol compared to 7.33 fold in men (Ellison et al., 2001; Olie et al., 2011). Even though Olie found that women may be at higher risk, research supports that both men and women with lower cholesterol may experience increased suicidality (Zhang et al., 2005; Marcinko et al., 2007; Jokinen et al., 2010; Olie et al., 2011). Additionally, it is important to note that lower cholesterol levels have been found to be associated with lifetime suicide attempts (Alvarez et al., 1999; Brunner et al., 2006).

Despite the evidence mentioned above more recent research casts doubt on whether the relationship actually exists. In more recent years, research in this area has emerged disproving previous study conclusions (Almeida- Montes et al., 2000; &Tsai et al., 2002). A retrospective study conducted on psychiatric inpatients did not find a significant difference in the cholesterol levels between patients who had attempted suicide and those who had not (Huang et al., 2001). Other studies that examined depression and its association to lower cholesterol and suicide reported no significant association between those variables (Deisenhammer et al., 2004: Haung et al., 2005; D'Ambrosio et al., 2012; Persons, 2012). The lack of association was also confirmed in a small study of suicidal borderline personality disorder patients who showed no cholesterol level differences (Marcinko et al., 2011). Lastly it is important to note that not only were findings unsupported but contradicted. In 2011 de Leon and colleagues evaluated 193 current

suicide attempters and found that lower cholesterol levels were not associated with increased suicide risk but with a decreased risk in men.

Gaps in the literature

Even though more studies support the claim that a relationship does exist, a clear conclusion cannot be determined. After conducting a review, De Berardis and colleagues identified potential problems and gaps that may have been overlooked. One possible problem could be the accuracy and precision of measures and study designs used in early findings supporting the relationship between cholesterol and suicide (De Beradis et al., 2012). Additionally, Pearson argues that in previous findings cholesterol was examined as a whole instead of looking at its parts, HDL-c and LDL-c, and that this may have played a role in the perceived relationship (2012). Lastly, change in cholesterol may be shared by other clinical conditions making it hard to clearly determine the relationship with suicidaltiy (De Berardis et al., 2012).

Recommendation(s)

- More longitudinal designs with larger samples
- More detailed look at the break down of cholesterol
- Need to eliminate confounding variables (which may be challenging)

Jetta Hanson, M.A.
Approved by: Peter Gutierrez, Ph.D.
Thomas Joiner, Ph.D.

References

Almeida-Montes, L. G., Valles-Sanchez, V., &Moreno-Aguilar J. (2000). Relation of serum cholesterol, lipid, serotonin and tryptophan levels to severity of depression and to suicide attempts. *Journal of Psychiatry and Neuroscience*, *25, 4,* 371–377.

Alvarez, J. C., Cremniter, D., & Lesieur, P. (1999). Low blood cholesterol and low platelet serotonin levels in violent suicide attempters. *Biological Psychiatry, 45, 8,* 1066–1069.

Atmaca, M. , Kuloglu, M. , Tezcan, E. , Ustundag, B. . Gecici, O., & Firidin, B. (2002). Serum leptin and cholesterol values in suicide Attempters. *Neuropsychobiology*, *45 ,3,* 124–127.

Brunner, J., Parhofe, K. G., Schwandt, R. P., & Bronisch, T. (2002). Cholesterol, essential fatty acids, and suicide. *Pharmacopsychiatry*, *35,1,* 1–5.

Brunner, J., Bronisch, T., Pfister, H., Jacobi, F., H¨ofler, M., & Wittchen, H. U. (2006). High cholesterol, triglycerides, and body-mass index in suicide attempters. *Archives of Suicide Research, 10,1,* 1–9.

Chang, S. S., Wen, C.P., Tsai, D.A., Lawlor, A., Yang, Y.C., &Gunnell, D. (2012). Adiposity, its

related biologic risk factors, and suicide : A cohort study of 542, 088 Taiwanese adults. *American Journal of Epidemiology, 175, 8,* 804-815.

D'Ambrosio, V. , Salvi, V. , Bogetto, F., & Maina, G. (2012). Serum lipids, metabolic syndrome and lifetime suicide attempts in patients with bipolar disorder. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *37,1,* 136–140.

De Berardis, D. ,. Serroni, N, & Campanella, D. (2008). Alexithymia and its relationships with C-reactive protein and serum lipid levels among drug na¨ıve adult outpatients with major depression. *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, *32,8,* 1982–1986.

de Leon, J. , Mallory, P. , Maw, L. , Susce, M. T., Perez-Rodriguez, M. M., & Baca-Garcia, E. (2011). Lack of replication of the association of low serum cholesterol and attempted Suicide in another country raises more questions. *Annals of Clinical Psychiatry,23,3,* 163–170.

Deisenhammer, E. A., Kramer-Reinstadler, K., Liensberger, D., Kemmler, G., Hinterhuber, H., & Fleischhacker, W. W. (2004). No evidence for an association between serum cholesterol and the course of depression and suicidality. *Psychiatry Research, 121,3,* 253–261.

Ellison, L.F., & Morrison, H.I. (2001). Low serum cholesterol concentration and risk of suicide. *Epidemiology, 12, 2,* 168–172.

Hibbeln J. R. ,& Salem, N. (1996). Risks of cholesterol-lowering therapies. *Biological Psychiatry, 40, 7,* 686–687.

Huang, T. L. (2001). Serum cholesterol levels in mood disorders associated with physical violence or suicide attempts in Taiwanese. *Chang Gung Medical Journal, 24, 9,* 563-568.

Huang, T.L. (2005). Serum lipid profiles in major depression with clinical subtypes, suicide attempts and episodes. *Journal of Affective Disorder, 86, 1,* 75-79.

Jokinen, J. , Nordstr¨om, A. L. , & Nordstr¨om, P. (2010). Cholesterol, CSF 5-HIAA, violence and intent in suicidal men. *Psychiatry Research, 178, 1,* 217–219.

Kim, Y. K., & Myint, A. M. (2004). Clinical application of low serum cholesterol as an indicator for suicide risk in major depression. *Journal of Affective Disorders, 81,2,* 161–166.

Kunugi, H., Takei, N., Aoki, H. , & Nanko, S. (1997). Low serum cholesterol in suicide attempters. *Biological Psychiatry, 41,2,* 196–200.

Marˇcinko, D. , Bili´c, V., & Pivac, N. (2011). Serum cholesterol concentration and structured individual psychoanalytic psychotherapy in suicidal and non-suicidal male patients

suffering from borderline personality disorder. *Collegium Antropologicum, 35,1,* 219–233.

Marcinko, D. , Marcinko, V., & Karlovi´c D. (2007). Serum lipid levels and suicidality among male patients with schizoaffective disorder. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 32,1,* 193–196.

Papassotiropoulos, A., Hawellek, B., Frahnert, C., Rao, G. S., & Rao, M. L. (1999). The risk of acute suicidality in psychiatric inpatients increases with low plasma cholesterol. *Pharmacopsychiatry, 42,1,* 1–4.

Penttinen, J. (1995).Hypothesis: low serum cholesterol, suicide, and interleukin-2," *American Journal of Epidemiology, 141,8,* 716–718.

Persons, J. E. , Coryell, W. H. , & Fiedorowicz, J. G. (2012). Cholesterol fractions, symptom burden, and suicide attempts in mood disorders. *Psychiatry Research, 200,2,*. 1088–1089.

Oli´e, E., Picot, M. C. , Guillaume, S. , Abbar, M. , & Courtet, P. (2011). Measurement of total serum cholesterol in the evaluation of suicidal risk. *Journal of Affective Disorders,133,1,* 234–238.

Rabe-Jabłon´ ka, J., & Poprawska, I. (2000). Levels of serum total cholesterol and LDL cholesterol in patients with major depression in acute period and remission. *Medical Science Monitor, 6, 3,* 539–547.

Ruljancic, N., Mihanovic, M., & Cepelak, I. (2011). Thrombocyte serotonin and serum cholesterol concentration in suicidal and non-suicidal depressed patients. *Progress in Neuro- Psychopharmacology and Biological Psychiatry, 35,5,* 1261–1267.

Sarchiapone, M., Camardese, G., & Roy, A. (2001). Cholesterol and serotonin indices in depressed and suicidal patients. *Journal of Affective Disorders, 62, 3,* 217–219.

Sullivan, P. F., Joyce, P. R., Bulik, C. M., Mulder, R. T., & Oakley-Browne, M. (1994). Total cholesterol and suicidality in depression. *Biological Psychiatry, 36 , 6,* 472–477.

Tsai, S. Y. M., Kuo, C.J., Chen, C.C., &Lee, H.C. (2002). Risk factors for completed suicide in bipolar disorder. *Journal of Clinical Psychiatry, 63,6,*469-476.

Troisi, A. (2011). Low cholesterol is a risk factor for attentional impulsivity in patients with mood symptoms. *Psychiatry Research, 188, 1,* 83–87.

Vevera, J., Zukov, I., Morcinek, T., & Papeˇzov´a, H. (2003). Cholesterol concentrations in violent and non-violent women suicide attempters. *European Psychiatry, 18, 1,* 23–27.

Zhang, J., McKeown, R. E. , Hussey, J. R., Thompson, S. J., Woods, J. R., &. Ainsworth, B. E. (2005). Low HDL cholesterol is associated with suicide attempt among young healthy

women: the Third National Health and Nutrition Examination Survey. *Journal of Affective Disorders*,89,1, 25–33.