Abstract

Mr Septica Sirs, 36 years of age, was admitted 3 days ago following a MVA with a haemo-pnemothorax (treated with UWSD and now resolved), hypovolaemia (which has now resolved with appropriate IV fluids), IDC (removed yesterday), deep lacerations to knee (wound has been debrided in theatre and now dressed daily), head injuries treated with burr holes on Day 2. His temperature today at 1400hrs is 39.4°C.

1. Mr Sirs has many risk factors for SIRS which does not necessarily have a bacterial focus. Some of the S/S of SIRS include: Hypovolaemia with decreased blood flow to vital organs, increased heart rate and stroke volume, acidosis, oliguria +/- anuria, peripheral oedema and Cardiogenic Pulmonary oedema.

2. Mr SIRS who is at risk for Sepsis/SIRs should be administered Panadol for temperature above 38°C. In addition, at T38o appropriate cultures should be obtained of blood, wounds, IV sites, urine, and sputum. If cultures are negative the patient does not have SIRS or sepsis.

3. Mr Sirs is due for the administration of an IVAB. One of his IV infusions is 0.9% Sodium Chloride. This infusion should not be switched off, the IV antibiotic should be administered with the concurrent infusion running at the prescribed rate and given over the time recommended. There is a risk however that further diluting the antibiotic decreases its therapeutic level.
Pathophysiology
and
Pharmacology
Assignment
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1</td>
<td>4</td>
</tr>
<tr>
<td>Question 2</td>
<td>6</td>
</tr>
<tr>
<td>Question 3</td>
<td>9</td>
</tr>
<tr>
<td>Question 4</td>
<td>12</td>
</tr>
<tr>
<td>Question 5</td>
<td>15</td>
</tr>
<tr>
<td>References</td>
<td>18</td>
</tr>
</tbody>
</table>
Question 1

Patients who are suffering with type II diabetes are studied to be at an elevated risk of acute renal failure, even if the risk factors are taken care of. This acute renal failure is more prominent in elderly patients and in those who are simultaneously suffering from other problems such as chronic disorders of kidney, congestive heart failure or high blood pressure. (Girman, et al., 2012)

In the event of acute renal failure, the basement membrane of the kidneys is damaged. The stiffening of the basement membrane causes changes in the pathology of cells of the mesangial and vascular region. The production of AGEs occurs; polyols collect through the aldose reductase reaction chain and the protein kinase C is stimulated. Other inflammatory pathways may also undergo activation due to the movement of the macromolecules causing secondary damage to the renal system. When the renal failure ensues in type II diabetes, glomerular hyperfiltration occurs causing intraglomerular hypertension. Next, in the course of renal damage microalbuminuria develops which eventually progresses to the condition of macroalbuminuria. Later, clinical deteriorations of the renal system may also cause albuminuria, edema, and nephrotic syndrome. (Evans & Capell, 2000)

Presence of microalbuminuria (30-300 mg albumin per day) can strongly confirm the presence of a cardiovascular disorder in patients with type II diabetes. The presence of protein in standard urinalysis tests depicts an already existing condition of macroalbuminuria. (Evans & Capell, 2000)

Patients suffering from severe kidney disease show symptoms such as persistent fatigue, general ill feeling, the presence of headache, nausea, vomiting, poor eating, deep breathing
pattern and swelling of the legs due to the presence of edema. The development of renal damage or subsequent renal failure is attributed to the presence of hypertension and poor control of blood sugar. In this case, consumption of unhealthy and fatty food, absence of a regular exercise and presence of urinary tract infection has played a significant role in further damaging the kidneys. (American Diabetes Care, 2012)

Generally the renal damage in patients with type 2 diabetes progresses without any visible signs and symptoms of the condition. This patient has shown symptoms of urinary tract infection. In the last 4/7 days, she has complained of a decrease in urine output, drowsiness, fatigue and nausea all of which are indicative of acute renal failure. (Mayo clinic staff, 2012)

Many cases of acute renal failure are asymptomatic. An increase in the blood urea nitrogen and creatinine present in serum are the diagnostic parameters of acute damage to kidney and renal tubules in patients with type II diabetes. An acute increase in the creatinine present in serum i.e. an elevation of about 0.5mg per dL is indicative of renal failure. Oliguria or urine output below 400 ml per day also indicates the presence of acute renal failure. Patients suffering with diabetes have increased susceptibility towards acute tubular necrosis. In this case the glomerular filtration rate and urine output go on decreasing as a result of an injury to the renal system. After this, recovery phase occurs which involves uremia and balance of electrolytes and acids, disruption of the tubular function causing physical problems for the patient. The condition of acute renal failure is also marked with an elevated K+ level and acid level i.e. hyperkalemia and acidosis. Acute renal failure is a disease which has catabolic mechanism, making the patients deficient in essential nutrients. This is the reason behind fatigue and malaise experienced by the patients suffering from acute renal failure. (Agrawal & Swartz, 2000)
Diabetic nephropathy occurs through a series of complex steps. Alterations in the hyperperfusion and hyperfiltration in the kidneys occur initially in the course of renal damage. This further helps in the progress to the release or outflow of albumin proteins from the capillaries in the glomerulus and bring about structural damage to the glomerulus such as thickening of the basement tissue, hypertrophy of the glomerulus, glomerulosclerosis, expansion of the mesangial cell and damage or destruction of the podocytes. These pathophysiologic mechanisms of the renal damage are responsible for signs and symptoms of acute renal damage. These clinical manifestations of the acute renal damage are a reduction in the rate of filtration of glomerulus and increase in the quantity if albumin being excreted. The most significant predisposing factors for acute renal damage have been reported to be poor control of glucose levels, increased blood pressure and cholesterol; all of which function in stimulating inflammatory mediators. (Bakris, 2011)

Question 2

Patients with type 2 diabetes are recommended to undergo annual screening for chronic kidney diseases. Random spot samples should be analyzed for albumin: creatinine ratio. The changes in the excretion of albumin from the urine are indicative of the presence of renal damage. It is well known that fever, sodium rich diet, rigorous exercise, the presence of microbial infection, lack of fluids, hematuria, pronounced sugar level, hypertension and CHF (congestive heart failure) are responsible for the increase in the albuminuria into microalbuminuria. Albuminuria is found to be absent in many cases of diabetic nephropathy and
hence the analysis of only the albumin secreted in urine is not enough. (Agrawal & Swartz, 2000)

The urine analysis, which has been recommended for patients with hyperglycemia dependent on insulin is evaluation of:

1. The urinary albumin excretion
2. Serum creatinine
3. Estimation of the glomerular filtration rate

The investigations for the assessment of acute renal failure in type II diabetes include compilation of complete medical history and a complete somatic examination. The tests of blood and urine are employed to give supporting data. Blood urea nitrogen and serum electrolyte, creatinine protein, electrolytes such as calcium ions, phosphorus ions and albumin protein along with a comprehensive blood count with variance is carried out in all diabetics. (Agrawal & Swartz, 2000)

The essential urine determinations are dipstick test, microscopic analysis, the concentration of sodium and creatinine and evaluation of the osmolality of urine related renal damage. Evaluation of the symptoms can reveal the cause of the related renal damage. In this case vomiting or poor intake is indicative of hypovolemia. Presence of fatigue or malaise in patients with acute renal failure is suggestive of vasculitis. (Agrawal & Swartz, 2000)

Other tests include complete blood count, serum biochemistry, and microscopic analysis of urine and determination of urine electrolytes. Renal imaging may also be needed if renal failure occurs after obstruction of the kidney. With reference to diagnostic tests, increased levels of blood urea nitrogen and creatinine form the most significant parameters to test renal failure. The
determination of the ratio of the blood urea nitrogen to creatinine is an important finding in the diagnosis of acute renal failure.

In urine analysis, the presence of free hemoglobin may suggest pigment nephropathy which may definitively diagnose the acute injury to the kidneys or renal system. The presence of red blood cells in the urine has pathologic reasons. The presence of eumorphic red blood cells depict that there may be some amount of bleeding found in the collecting system. If RBC casts are found in the urine, then there may be some glomerular inflammation present in the patient. The presence of white blood cells or WBC casts is suggestive of the presence of pyelonephritis or acute interstitial nephritis. If eosinophils are present in urine, then there may be a presence of urinary tract infections. (Workench, 2014)

The determination of electrolytes in urine also acts as an important test to determine the function of the renal tubules. In patients of acute renal failure with oliguria, determination of the fractional excretion of sodium is important. The presence of urea in urine is also used to suggest problems with urea transport. (Workench, 2014)

An elevation of creatinine acts as a marker for renal dysfunction and an elevation of the creatinine level depicts that there is a marked reduction in the glomerular filtration rate. (Workench, 2014)

It is of the utmost importance that early signs of the microvascular condition can be detected to prevent further progression and complications of the disease. Hence, screening for microalbuminuria has to be undertaken as part of regular preventive care of the diabetic patients. (Evans & Capell, 2000)
It has been recommended that more sensitive dipsticks or urine analysis tests are needed for the detection of albuminuria. Among various methods available for the screening of the urine comprises of 24-hour urine collection along with serum and urine creatinine provides values for the calculation of the rate of elimination of creatinine. Spot urine samples are used to calculate albumin: creatinine ratio or the rate of excretion of albumin in a specimen, kept over time (4 hours or overnight). (Evans & Capell, 2000)

Another important factor is that the diagnostic screening for acute renal failure in type II diabetes should avoid other parameters which may have a transient effect on the albumin excretion or albuminuria which may include poor control of blood sugar, exercise, fever, urinary infection, another systemic infection or presence of significant hypertension. (Evans & Capell, 2000)

Question 3

Metformin is a biguanide derivative and has been used as a first line treatment in hyperglycemic patients. It is used to normalize the concentration of sugar in the blood and also reduces the risk of different complications arising from diabetes. (Smiechowski, et al., 2013)

In this case, the treatment of diabetes is aimed at reducing blood glucose levels to normal levels. This is also meant to control the short term effects of hyperglycemia and hypoglycemia as well as to prevent any chronic complications of diabetes. Metformin is also linked with lesser danger of deaths. (Johnson, et al., 2002)
Metformin acts by improving the peripheral sensitivity to insulin, reducing the absorption of glucose in the gastrointestinal system and facilitating the formation of glucose in hepatic cells. These mechanisms play an important role in reducing hyperglycemia. The advantage with the use of metformin is that it does not stimulate the condition of hyperinsulinemia, lead to hypoglycemia or cause weight gain. It also improves the serum lipid profiles in patients who are either lean or overweight and in whom diabetes is not managed through diet. It is also given in combination with sulfonylurea as a secondary measure of treatments. It has also been used along with insulin to bring down the requirements of insulin in a patient with type II diabetes. (Davidson & L, 1997)

There are some well tolerated gastrointestinal side effects related to type II diabetes. There is a minimal risk of lactic acidosis. It does not show any drug interactions except with cimetidine and sulfonylureas. The plasma concentration of metformin is found to be increased when used together with cimetidine. It has a synergistic effect on reducing blood sugar when used with sulfonylureas. Overall, it is a safe and effective monotherapy agent in the treatment of type 2 diabetes. It is especially useful in those cases where hyperlipidemia co-exists with hyperglycemia. (Davidson & L, 1997)

Metformin diminishes the concentration of glucose in blood by inhibiting the formation of hepatic glucose, reducing the resistance of insulin, especially in the liver and skeletal muscles. With the use of metformin, the plasma levels of insulin will not be altered. Metformin reduces the absorption of insulin from the intestine, increases the uptake of glucose and its utilization in the peripheral tissues and hence increases the sensitivity of insulin. Monotherapy with metformin is observed to reduce the HbA1C concentrations. (Maric, 2010)
The most troublesome side effect of metformin is lactic acidosis and hence its use is contraindicated in patients with disorders of the renal system. In this respect, the limiting value of creatinine clearance is 60 ml/min. (Maric, 2010)

Metformin is prescribed in hyperglycemic patients and is known to cause either no variation in body weight or a slight reduction in body weight, use of metformin leads to a reduction in complete cholesterol levels, low density lipids and triglycerides in patients with type II diabetes. (Maric, 2010)

Researchers have found out that the infection of the urinary tract occurs commonly in patients with NIDDM, especially in females. (Farahmand, et al., 2010)

Hyperglycemic patients suffering from an infection of the lower urinary tract are prone to develop some uncommon problems. A urinary tract infection is generally treated with the use of antibiotics, which penetrate deeply within the tissues for approximate 7 to 14 days. (Schneeberger, et al., 2008)

Trimethoprim is the first choice drug for the cure of infection of the urinary tract without any complications. In women, the treatment period is of at least 3 days to treat the uncomplicated urinary tract infection. (Jackson, et al., 2013)

Trimethoprim belongs to the anti-folate group of antibiotics and should be used in female patients who are not pregnant. The advantage of using trimethoprim in females with an uncomplicated urinary tract infection is that it does not increase resistance. It is prescribed in a dosage of two times a day. The drug is inexpensive and can even be used in children. 100 mg of trimethoprim is suggested to be given every 12 hours. Trimethoprim should not be sued in patients who have a renal clearance of less than 15 ml/minute. (Watson Lab Inc, 2008)
The side effects which have been associated with the use of trimethoprim are skin reactions and gastrointestinal disturbances. The strains which are susceptible to trimethoprim are E. coli, Proteus mirabilis, Klebsiella pneumonia, Enterobacter sp and Staphylococcus sp. (Watson Lab Inc, 2008)

Question 4

In patients with Diabetes mellitus, hypertension acts as a primary element of risk for cardiovascular diseases, stroke and ischemic heart disease. The coexistence of hypertension with type 2 diabetes occurs much more frequently when compared with non-diabetic patients. This is a leading cause for the development and further growth of various problems of macrovascular as well as microvascular origin in individuals suffering with NIDDM. (Mohamed, et al., 2012)

Hypertension adds to the mortality rate in hyperglycemic patients. The systolic hypertension value>130 m of Hg or diastolic value of blood pressure>80 mm Hg is clinically described as hypertension in patients with hyperglycemia. (Gilbert, et al., 2011)

Various factors including genetic history of hypertension, environmental and biological factors such as unhealthy eating habits, lack of physical activity, sodium retention, obesity (especially abdominal), stiffening of the arteries, dysfunction of endothelium and irregularities of the autonomic system are involved in hypertension patients with hyperglycemia. It has also been reported that a diabetic patient with a systemic blood pressure in the range of 120 and 139 mm Hg has a similar mortality as that of a patient without diabetes and systolic hypertension between 160 to 179 mm Hg. (Gilbert, et al., 2011)
The most important intervention to manage the blood pressure in hyperglycemic patients is the pharmacological reduction of the blood pressure. The regulation of hypertension in patients with diabetes is extremely important to alleviate the mortality rate, circulatory diseases, retinopathy and nephropathy. The use of ACE inhibitor or an ARB lowers blood pressure and also prevents acute renal failure. It is advantageous when used in diabetic patients with chronic kidney disease and microalbuminuria and macroalbuminuria. Alternatively, calcium channel blockers and diuretics in low dosages are used as the first line treatment in patients who do not have microalbuminuria. (Gilbert, et al., 2011)

Hypertension in hyperglycemic patients is also associated with other health risks as well. Proper treatment of hypertension in individuals with hyperglycemia is extremely important to avoid other risk factors for various other diseases. Patients should be managed for dyslipidemia, increased blood glucose concentration and central or abdominal obesity. The lifestyle interventions i.e. cessation of smoking, changing unhealthy eating habits and inclusion of regular physical activity in the daily routine are very important to manage blood pressure. (Gilbert, et al., 2011)

The most commonly found complications associated with hypertension and type 2 diabetes are cardiovascular diseases and renal diseases. It has also been studied that there is a definite relation between hypertension, age, Body mass index and duration of diabetes. The duration of type II diabetes has a significant association with different macrovascular and microvascular complications which eventually led to the emergence and progression of renal hypertension or atherosclerotic hypertension. (The ACCORD study group, 2010)
Research studies have also reported that an intensive use of antihypertensive agents to reduce blood pressure brings about a significant reduction in the mean systolic blood pressure, but does not necessarily reduce the associated complications or mortality rate. (The ACCORD study group, 2010)

The use of beta blockers to treat hypertension can also be instrumental in the occurrence of NIDDM. Some studies have reported that antihypertensive therapy may also lead to the condition of glucose intolerance. The use of beta blocker can cause weight gain and also reduces the release of insulin from the pancreatic islet cells. (Gress, et al., 2000)

In diabetic patients suffering with type II diabetes, insulin resistance can increase the sympathetic activity, absorption of sodium from renal tubules or vascular tone which may eventually lead to hypertension. The American diabetes association has recommended regular monitoring of blood pressure in patients with diabetes. The recommended measure is the regulation of blood pressure level is considerably more important to regulate blood levels to prevent cardiovascular complications. The American diabetes association has also recommended management of blood pressure through lifestyle modifications for at least 3 months. The use of ACE inhibitors or ARB blockers not only reduces blood pressure levels, but also inhibits the progression of diabetic nephropathy and decreases any microalbuminuria. (Holman, 2010)

Patients with type 2 diabetes should follow up the medical care team until their blood pressure comes down to normal levels. The evaluation and determination of blood urea nitrogen and creatinine levels along with the estimation of the glomerular filtration rate is important for patients with coexistent diabetes and hypertension. If the patient is being given ACEI or ARB, then his potassium levels should also be checked 2 times in a week. (Holman, 2010)
Question 5

Studies have reported that individuals with a body mass index over 45 are severely obese and lead a life with life expectancy reduced by almost 20 years. Obesity is a problem which can aggravate the condition of hyperglycemia in NIDDM. Body mass index or BMI can be described as body weight, which has been adjusted for height. (Olshansky, et al., 2005)

Type 2 diabetes is marked with both insulin resistance and insufficient secretion of insulin. It has been studied that overweight individuals exhibit insulin resistance. It is proven that type 2 diabetes can only develop in patients who are not capable of increasing the secretion of insulin to make up for resistance to insulin. (Olshansky, et al., 2005)

In obese individuals, the impaired functioning of beta cell is seen as a pathological abnormality and marks the progression of pre-diabetes to diabetes. A high calorie diet and physical inactivity act as inducers of insulin resistance, enhance the quantity of glycogen as well as insulino tropic hormones dependent on glucose leading to glucose intolerance. An increased risk of type 2 diabetes is dependent on various factors such as;(Day & Bailey, 2011)

1. Changes in the metabolism of unsaturated fatty acids
2. Irregularities of the metabolism of fat
3. An increase in adiposity and resistance to insulin

 Increased concentration of LDL, low concentration of HDL and increased the level of lipoproteins rich in triglycerides increase the danger of heart disorders in diabetics. This is related to both insulin resistance and co-existing abnormalities of lipid profile. An elevation in the lipid amount in the liver and smooth muscles is also related to the occurrence of insulin
resistance. Obese patients with diabetes have persistent abnormalities of lipids. Obesity or excessive calorie intake may lead to the complexities of diabetes. The body mass index of 45 causing excess weight can also increase the risk of diabetes. It has also been reported they almost 90% of the patients with type diabetes are obese. In fact, a diet rich in energy can also cause diabetes and associated complications. (Khordori, 2014)

Excess fat in any part of the body is known to be related to an enhanced susceptibility to type 2 diabetes and heart problems. Increased weight in the abdominal region has been studied to be a independent risk for type 2 diabetes, which is primarily due to an increase in adiposity. Intracellular lipotoxicity plays an important role in those cases where excessive deposition of lipids occurs in muscle and liver. Obesity is considered to be risk factors for type 2 diabetes and insulin resistance due to the lipotoxicity it causes. The increase in the quantity of fatty acids and lipids in body tissues has damaging effects on the cells. Excessive adiposity can lead to onset as well as the severity of insulin resistance which can cause type 2 diabetes.

Increased adiposity inhibits the metabolism of glucose, causing the release of free fatty acids in the blood circulation. This imbalance of the glucose fatty acid cycle leads to aggravate insulin resistance and high blood sugar through a cascade of steps. There is a reduction in the mitochondrial mass in type 2 diabetes, which requires excess fatty acids to be utilized in various non-oxidative pathways, which eventually leads to the development of insulin resistance. Insulin signaling is also affected when excess fat deposits in the liver. The impairment of insulin signaling results in the failure to prevent the increased production of glucose, which eventually leads to lipotoxicity and death of hepatocyte cells.
Subcutaneous fat is more commonly present in women, but it has been studied that visceral fat cells are more significant in causing insulin resistance. As the fatty acids are released into the portal vein, leaving a direct effect on the metabolism of hepatic energy and causing hepatic lipotoxicity. This is an important causative factor of insulin resistance.

Adipokines present in overweight patients play a primary role in altering the sensitivity of insulin and hence are related to insulin resistance. The depots of adipose tissues produce pro-inflammatory cytokines such as TNFα and IL-6. These cytokines have an inhibitory effect on the sensitivity of insulin by blocking the phosphorylation of insulin receptor and also the insulin signaling reactions from the receptor. Cytokines also raise the level of fatty acids in circulation. (Day & Bailey, 2011)

Retinol binding protein, resistin, adiponectin, leptin and other adipokinase and cortisol are also formed or released from the adipose tissue. All these play a significant role in causing hyperglycemia. Obesity leads to a reduction in fatty acids, oxidation due to a decreased number, size, and the function of mitochondria. This increases cytokine production through a cascade of steps causing insulin resistance. (Day & Bailey, 2011)

Thus an excess adiposity leads to a series of clinical consequences, including a comparison of the cardiac function, insulin resistance, dysfunction of the beta cell, lipotoxicity and glucotoxicity eventually causing type II diabetes (Day & Bailey, 2011)
References


Mohamed, B. et al., 2012. Hypertension and type 2 diabetes: a cross sectional study in Morocco. Pan African medical journal, Volume 11, pp. 52-. 


<table>
<thead>
<tr>
<th>Criterion</th>
<th>Levels of achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exemplary</td>
</tr>
<tr>
<td>Writing style and presentation are clear</td>
<td></td>
</tr>
<tr>
<td>• Introduction</td>
<td>Introductory statement clearly indicates the main purpose of the contribution and suggests the plan of organization, so the reader can anticipate the text that will follow.</td>
</tr>
<tr>
<td>• Main Body</td>
<td>Main body of contribution makes connected points that clearly build the argument so the text flows from introduction to conclusion in a logical manner, thereby helping the reader to follow the thinking behind the text.</td>
</tr>
<tr>
<td>• Conclusion</td>
<td>The main point of the contribution is clearly indicated and reinforced so the reader can clearly remember it.</td>
</tr>
<tr>
<td>• Written expression</td>
<td>Sentences and paragraphs are well structured and clear so the reader can focus on what is written. Each paragraph has a topic sentence that indicates the subject matter.</td>
</tr>
<tr>
<td>• Grammar, punctuation and spelling</td>
<td>Grammar, spelling and punctuation are flawless, which allows the reader to focus on the message.</td>
</tr>
</tbody>
</table>

Concepts and arguments are well developed

• Accuracy                                      | All information is accurately reported using appropriate | The information is largely accurate but imprecise language could lead a reader to | Although the gist of the information is correct, |
<table>
<thead>
<tr>
<th></th>
<th>terminology so the information is reliable.</th>
<th>misinterpret aspects of the text.</th>
<th>there are problems with the interpretation of it. A reader can be misled by the text.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevance</td>
<td>Connections between the contribution and the main topic of the discussion are clearly indicated.</td>
<td>Connections between the contribution and the main topic of the discussion are indicated or implied, but the reader needs to pause to clarify those connections.</td>
<td>Although the text is relevant, this is not clearly indicated, so the reader must guess how the text relates to the main topic.</td>
</tr>
<tr>
<td>Significance</td>
<td>The reason why the contribution is important to the overall discussion is clearly described and discussed so the reader takes the contribution seriously.</td>
<td>The reason why the contribution is important is touched on but not elucidated, so the reader must make some interpretations about the author’s view of the contribution’s significance.</td>
<td>The contribution may include significant material but this is not indicated, so the reader must guess it.</td>
</tr>
<tr>
<td>Clarity</td>
<td>The main points and new technical terms are clearly described and/or explained so the reader is left with no ambiguity about what was written.</td>
<td>Although the text is clear to informed audiences, unexplained points may leave room for alternative interpretations of the text.</td>
<td>Key points and new technical terms are not explained so the reader is confused.</td>
</tr>
<tr>
<td>Independence</td>
<td>The contribution is completely self-contained so the reader does not have to read other contributions or published materials to understand what was written about.</td>
<td>The text is sufficiently clear that the reader can understand the main point without further reading, but some parts of the text are not clear without consulting earlier contributions or other sources of information.</td>
<td>The text is written in a manner that presumes considerable prior knowledge, so the reader must have a thorough knowledge of what has been written about the subject in order to understand the main point of the contribution.</td>
</tr>
<tr>
<td>Contribution is responsive to another contribution</td>
<td>The writer links ideas submitted by others to their own contribution in a manner that substantially strengthens the group’s efforts to resolve the main problem. This linkage can include elaboration of what was previously written, a critique or questioning of it, demonstration of linkages among two or more earlier contributions, and/or utilization of an earlier contribution as a foundation to build your own.</td>
<td>The writer makes references to earlier works that are a starting point for new ideas but, apart from the reference to the earlier work, not much information is incorporated.</td>
<td>The text mentions other contributions but neither explains the reference nor substantially adds to it, so there is no clear benefit to the resolution of the main problem from citing the earlier contribution.</td>
</tr>
</tbody>
</table>

**Text is supported by references**

- Sources: All information and ideas that are Most sources are indicated, but in only a Sources are cited for some.
| **indicated** | not commonly known are supported with references to sources, so the reader has confidence that the information is not based on hearsay or the writer’s opinion or assumptions alone. Few cases the sources are not given or are ambiguous, so the reader has to check some of the sources. Specific parts of the contribution, but no references are supplied for information and ideas that are clearly not the author’s, so the reader has no idea of the validity and authority of the information. |
|---|---|---|
| **Relevant references** | Information, concepts and opinions are supported with references to published literature, especially primary (original) sources of information, rather than review articles or textbooks. This allows the reader to independently review the cited sources. More than one reference is cited to support key points, which adds strength and authority to the argument. One or a few references are used to support the text. Thus the contribution is supported but this may be an idiosyncratic source. Some general references to textbooks are made that could have been replaced by primary references which are more thorough and authoritative. Information comes from Web sites or other sources that have no recognized authority, so the validity or strength of the source is unknown. |
| **Citation style** | References cited appropriately in the text, and the correct format is used in the text when citing information, so the reader clearly knows which information is attributable to which source. Minor lapses in citation format do not prevent the reader from finding the source in the reference list at the end of the contribution. Citation format incorrect or poorly placed in the text, so citations distract from reading. |
| **Bibliographic information** | The reference list contains complete bibliographic information (author’s name(s), publication date, title, source, date web page accessed), so a reader can easily find the references for their own research. The authority of sources can be evaluated by checking them. Bibliographic information largely complete, but some information missing so the reader may have difficulty finding some references. Most sources can still be easily checked. Not all references are listed, information in the reference list is incorrect, or important information is missing from the reference list, so the reader is unable to find the same sources of information and the authority of sources is almost entirely unknown. |
**Comments:** The piece of work has been written in great detail. The work has been written in a way that makes a non-subject expert to well understand the work. Little more efforts in some technical sections would have made the work be considered at par with “perfect”.