Acute Cholecystitis/Biliary Colic Cliff

Branch Baseline

The presence of cholesterol- or bile pigment-based stones in the gallbladder is a relatively common condition which can lead to a variety of serious complications. Risk factors for gallstones include age, obesity, diabetes mellitus, pregnancy, and alcohol use. In addition, the condition is about four times as likely in women as in men during the reproductive years; this gender discrepancy diminishes with age. The current standard treatment for most complications of biliary disease is cholecystectomy, or surgical removal of the gallbladder (Schirmer, 2005).

The symptom complex of biliary colic consists of epigastric and right upper quadrant abdominal pain associated with nausea and often vomiting, occurring 30 to 60 minutes after meals. It persists from 20 minutes to several hours. Biliary colic should be distinguished from acute cholecystitis. Three of the severe complications of gallstone disease are acute cholecystitis, acute biliary pancreatitis, and acute cholangitis (Schirmer, 2005).

Acute cholecystitis, or inflammation of the gallbladder, can lead to progressive pain, fever, and possible necrosis of the gallbladder; treatment requires antibiotics and early surgical intervention (Schirmer, 2005). Biliary pancreatitis occurs when a gallstone passes into and through the common bile duct, leading to abdominal pain and potential inflammation; treatment for this condition includes endoscopic removal of the stone and cholecystectomy (Schirmer, 2005). Cholangitis is the infection of an obstructed bile duct, causing pain and fever (Sanders, 2007).

Three events causing hospitalization had occurred among the astronauts corps on the ground and during pre-flight period. There have not been any cases of biliary colic or cholecystitis reported in flight (Johnston, 2008).

Incidence Data Included in the Model

The model imports the following incidence information from the IMM database: incidence data category, space adaption status, incidence data, incidence and occurrence distribution data and incidence data characteristics. Data category defines the type of data available for incidence calculations (i.e. raw data vs. fixed data). Space adaptation identifies medical events that onset occurs in the first 5 days of flight and does not reoccur. Incidence values vary by data category and define the number of medical events per person-year or medical events per person-at-risk for each medical condition. Incidence values can be modified by crew characteristics such as gender. Modifying characteristics are noted below and incidence values are listed individually for each characteristic. Distributions are assigned to medical events incidence values and occurrences in the model. For each crew member in a given trial, the incidence and number of occurrences of each medical condition are randomly selected from these probability distributions. Detailed descriptions of the distributions are included in the IMM Technical Description Document.

Incidence	
Data Category:	Model
Space Adaptation:	No
Incidence Type:	Rate

Distribution Data	
Incidence:	Lognormal
Occurrence:	Poisson

Female Data Characteristics	
Mean:	0.00127
Standard Deviation:	7.68E-06

Male Data Characteristics	
Mean:	0.000769
Standard Deviation:	4.65E-06

Incidence Comments

Although gallstones may be asymptomatic, the complications of symptomatic gallstone disease may have a negative impact on crewmember health, morale, and performance. Owing to the debilitating symptoms of these conditions and the difficulty posed by surgical treatment requirements to space exploration missions, the incidence rate of severe gallstone disease in astronauts must be calculated (Gilkey, 2012).

The incidence rate of acute cholecystitis, biliary pancreatitis, and cholangitis from a general population study (Urbach, 2005)was combined via Bayesian update with data on the incidence of severe gallstone disease in the astronaut corps from LSAH (Mason, 2011) to yield a probability distribution describing the incidence rate of severe gallstone disease in astronauts.

The probability distribution describing this rate in the general population was determined from a study published in the Canadian Medical Association Journal (CMAJ) (Urbach, 2005)which used data from the Canadian Institute for Health Information, the Ontario Health Insurance Plan physicians claims database and the Registered Persons Database to determine the annual incidence rates of acute cholecystitis, acute biliary pancreatitis, and acute cholangitis per 100,000 population during the period 1988-2000. The study determined incidence rates for the three conditions separately; in addition, incidence rates were stratified by gender and by age. In order to obtain an overall estimate of severe gallstone disease incidence in a general population as similar as possible to the astronaut corps for the purposes of Bayesian Analysis, these incidence rates were combined assuming independence of occurrence between different age groups and among the different diseases. (Gilkey, 2012).

Data concerning the incidence of severe gallstone disease in the astronaut corps was obtained from the LSAH (Mason, 2011). There were no occurrences of severe gallstone disease in-flight among astronauts, and there were no occurrences at any stage in female astronauts. The 3 preflight occurrences of gallstone disease in men were all 3-6 years pre-flight. The pre-flight incidence of severe gallstone disease in male astronauts was 0.00152 events/person-year. When male and female incidences were combined to determine the overall incidence rate, the preflight incidence was calculated as 0.00134 events/person-year (Gilkey, 2012).

Results of the Bayesian Analysis for gallstone disease among astronaut is in flight, are in events per person-year. Mean are 0.000769 for male, 0.00127 for female and 0.00102 total. Standard deviations are 0.00000465, 0.00000768 and 0.00000618 respectively. (Gilkey, 2012).

This analysis is limited by the fact that it assumes a constant rate of occurrence for gallstone disease without accounting for physiological and environmental risk factors for disease (Gilkey, 2012).

Information Regarding Prevention

Selection criteria

Disqualifying conditions include, in general, any medical condition that may compromise mission operations or crew safety, or require urgent medical treatment while resident on the ISS; in Abdomen and Digestive System, any chronic, recurrent, or major progressive liver, gallbladder, or pancreatic disorder. Cholelithiasis, cholecystitis, or chronic acalculous cholecystitis until surgically corrected and resulting in no postoperative dysfunction. This may be demonstrated by a low EF (less than 35%) on CCK-HIDA scan. Acute pancreatitis due to trauma or due to surgically corrected cholecystitis with no further episodes requires Special Consideration by the MSMB (International Space Station Program, 2009).

Additionally, prior to deployment on a long duration mission (6 months or longer) astronauts are required to undergo an additional screening abdominal ultrasound within a year of deployment (International Space Station Program, 2009).

Vehicle requirement(s)

Surgical capabilities are limited in flight. Ultrasound is available for diagnostic capabilities. Percutaneous drainage and laparoscopic surgery are currently unavailable on ISS, but may be available on future exploration missions based on vehicle capabilities and the crew medical officer training (Campbell, 2008).

Other

Given that gallstones can grow at a rate upwards of 2mm/year (Lowenfels, 1989) and the average duct is approximately 4-5mm (Laks, 2002)during the operational life of an astronaut it is reasonable to presume that biliary colic/cholecystitis may occur during a long duration mission.

Incidence Level of Evidence (LOE)

The IMM level of evidence appropriate assessment of the quality of the IMM input data. Since IMM incorporates input data from a wide variety of sources including astronaut population, terrestrial or analog populations, and external models, an innovative approach to assess the quality of input data was required. Information obtained from the astronaut population and/or space flight is the more relevant so it is assigned the highest level of evidence and less relevant data sources are assigned a lower level of evidence.

Citation	LOE Value	LOE Category
Gilkey, 2012	2	Incidence
Urbach, 2005	2	Incidence
Mason, 2011	1	Incidence

Incidence data not included in the model

The model pulls the incidence information from the IMM database ... the information shown below does not go into the model.

Incidence	
Data Category:	Model
Space Adaptation:	No
Incidence Type:	Rate

Distribution Data	
Incidence:	Lognormal
Occurrence:	Poisson

Data Characteristics	
Mean:	0.00102
Standard Deviation:	6.19E-06

Incidence Comments

Currently the model uses male and female incidence rates.

Results of the Bayesian Analysis for gallstone disease among astronaut is in flight, are in events per person-year. Mean is 0.00102 and standard deviation 0.00000619 for the total population (Gilkey, 2011). Total population rates do not go into the model.

Alternative Incidence Data

Analog populations

An analysis of 10 years of data collected on US Navy Polaris submarine patrols over the ten year period 1963-1973 reported a total of 1685 medical events treated. Illness rates are indicated as new/cases/1000 man-days. There were a total of 229 gastrointestinal diseases events during the 1963-73 period There were eight cholecystitis events; causing 69 sick days, Table A3, 8.6 sick days average per event. There were a total of 229 surgery events; one case of cholelithiasis, causing 3 sick days, reported in General Surgery, Table A7. Illness rate and rate of days lost were significantly higher than those observed in the surface population (P <0.05) . Six EVACs occurred for digestive and 6 for surgery, but there is no EVAC information by condition (Tansey, 1979). Our estimate cholecystitis rate per person year is 0.00045 during the period 1963-67 and 0.00033 during the period 1968-73 (4/3,240,000 1963-67 = 1.23e-6, x 365 = 4.50e-4) and (4 cholecystitis 1968-1973, /4,410,000 person-days, = 9.07e-7 x 365 = 3.31e-4 person years). **Our estimate cholelithiasis rate per person year is 0.000082** (1/4,410,000 person-days = 2.26e-7 x 365 = 8.27e-5).

A Navy survey reported that 17% of medevacs are due to gastrointestinal diseases. There were 71 non-dental, digestive EVACs. One Medevac due to cholecystitis, cholelithiasis, cholangitis and other diseases of gallbladder and biliary tract (Nice, 1984).

Three events causing hospitalization had occurred among the astronauts corps on the ground and during pre-flight period. One Cholelithiasis/chronic Cholecystitis was a Class IIc medical event, manageable with the HMS but may require emergent evacuation if the conditions does not improve or worsens. One cholecystitis and one cholelithiasis were class III, i.e. requiring emergent evacuation from the ISS (Johnston, 2008).

Waiver Experience due to gallbladder disease in the US armed forces was reported by the Aerospace Medical Association Clinical Practice Guidelines. A review of the Air Force Aeromedical Information Management Waiver Tracking System (AIMWTS) revealed a total of 56 aviators with waiver submissions containing the diagnosis of cholelithiasis. Of the total of 56 cases, 29 were identified as asymptomatic, 21 were treated with a laparoscopic cholecystectomy, 3 with a cholecystectomy (not specifically described), and 3 treated via other procedures. Two cases were disqualified, and each for a medical problem not related to gall bladder disease. The 27 treated cases would not necessarily have required a waiver assuming they recovered well and did not require a waiver for any other diagnosis. In the Army Aeromedical Epidemiological Data Repository, over a recent two year period, there were 1,741 unique rated aircrew encounters filed. Among these five were coded for cholelithiasis leading to one suspension (Van Syoc, 2011).

Non Analog population

The majority of biliary colic/cholecystitis occurs in the elderly (65+) with the next highest incidence for the 45-64 y/o cohort, therefore the incidence rates reported are skewed to these age groups. National Institutes of Health (Everhart, 2008) reported incidence rates by age groups, with gallstones first listed diagnosis, in hospital discharges for the general population. This category was chosen to reflect confirmed cases of biliary colic that would require treatment or require hospitalization. There are significant gender differences, with an incidence of 85/100,000 (0.00085) in males and 151/100,000 in females (0.00151), ratio 1:1.78. Unfortunately these differences are not stratified by age. Their sources are National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS). Data are a 3-year average, from 2003 to 2005. It should be noted that this is a very conservative estimate of the incidence per person-year. These values are for a general population and given that the astronaut population is screened on selection and prior to long-duration flight our actual incidence would be significantly lower than this correlate.

Treatment and Outcomes

Based on the best evidence available best and worst case percentage ranges are assigned. The medical condition is divided into three clinical phases in all three clinical phases a functional impairment is assigned. The clinical phase I and II's functional impairments remain for the duration for that respective clinical phase. The function impairment in clinical phase III represents final impairment for this medical condition and remains for the rest of the mission. Other mission end states include evacuation and loss of crew life.

The IMM checks medical resource availability once the number of medical events and scenarios has been established. If there is not sufficient essential resources called out in the CliFF, then the medical condition will go down an untreated best or worst case scenario pathway.

The table below summarizes the treated and untreated best and worst case scenarios.

	Clinical Phase I Diagnosis & Initial Treatment[1]		**Clinical Phase II On-going Treatment / Convalescence[2]**		**Clinical Phase III Recovered / Mission End State[3]**		
	FI* (%)	**Duration (hrs)**	**FI* (%)**	**Duration (hrs) (Min - ML - Max)**	**FI* (%)**	**EVAC** (%)**	**LOCL** (%)**
ISS-based Treatment (best case scenario %: 80 - 100)	100	1.5 - 2	2 - 27	0 - 12 - 24	0	0	0
ISS-based Treatment (worst case scenario %: 0 - 20)	100	2 - 3	16 - 42	24 - 48 - 72	0 - 42	100	0
Untreated Best Case	N/A	N/A	16 - 42	0 - 12 - 24	0 - 27	0 - 100	0
Untreated Worst Case	N/A	N/A	30 - 57	24 - 48 - 72	30 - 57	100	0

[1]Clinical Phase I: Clinical phase I covers only the initial assessment of the affected crew member to define his or her medical condition, and completion of appropriate initial treatment to stabilize the crew member. While the affected crew member is being assessed, he or she is not able to perform any assigned tasks, thus Functional Impairment during this phase is considered 100%. In the untreated case, there is no diagnosis performed or treatment given, therefore Functional Impairment and Duration will always be "not applicable".

[2]Clinical Phase II: On-going Treatment and Convalescence- During clinical phase II, the affected crew member is receiving any appropriate follow-on treatment for his or her medical condition to allow the crew member to recover as much as he or she is able to recover in the ISS environment. Clinical phase II also encompasses relapses or reoccurrences of the same original medical condition in clinical phase I necessitating additional treatment or recovery time due to unsuccessful primary treatment response. The duration in Clinical Phase II is expressed in minimum, most likely (ML) and maximum hours. This was updated for future capabilities in IMM but is currently not being used by the model.

[3]Clinical Phase III: Recovered/Mission End State- Clinical phase III is reached once the affected crew member has recovered from the medical condition as much as he or she is able to recover in the ISS environment. This may or may not be recovery from the given medical condition to the full extent possible. If this "recovered" state results in an evacuation or loss of the crew member, this will be noted in the mission end state results.

*Functional Impairment (FI) is a measure of the affected crew member's health and performance ability.

**Two mission end state results are addressed in the CliFF: 1) Evacuation (EVAC) - crew and patient are evacuated from the spacecraft due to the medical condition, and 2) Loss of crew (LOCL) - death of affected crew member due to medical condition. EVAC is considered as an end state result if any of the following criteria are met: 1) potential LOCL, 2) potential significant permanent impairment, or 3) potential intractable pain. Probability distributions are assigned for each range of values within the Table of Treatments and Outcomes.

Refer to the Integrated Medical Model Technical Document for more information on how risk is reported by the IMM, Crew Health Index (CHI) and Quality Adjusted Mission Time calculations.

Definition and Probability of Best and Worst Case Scenario: (includes definitions of best and worst case scenarios and identifies the probability of those scenarios.)

Scenario Comments

The best case scenario is defined as a course of uncomplicated biliary colic which resolves spontaneously or causes minimal disturbance requiring only symptomatic pain management.

The worst case scenario is defined as acute cholecystitis with likely complications requiring significant pain management, antibiotic administration and likely definitive surgical management.

Complicated acute cholecystitis may result in perforation and sepsis. Septic shock is addressed in the Sepsis Clinical Findings Form (CliFF).

Percentages of how often best versus worst case scenarios occur were estimated from terrestrial studies. Approximately 20 percent of patients in the observation group had recurrent biliary pain (Vetrhus, 2002) cited in (Bellows, 2005); or developed acute cholecystitis (Carter, 1987) cited in {Strasberg, 2008 4162 /id } requiring hospital admission. To allow for uncertainty, our estimated worst case scenario is 0-20%; thus the best case scenario is 80-100%.

Best Case Comments

Functional Impairment (FI) was derived by using the IMM severe non-space adaptation template. Biliary Tract disease ratings are based on Table 6-9, p. 120 (American Medical Association, 2008). Complex Regional Pain Syndrome – Lower Extremity (CRPS -LEI) is based on Table 16-15, p.541. The CRPS (LEI) ratings are then converted to percentage of Whole Person Impairment (WPI), which are based on Table 16-1, p 495 and Table 16-10 pp.530-531 (American Medical Association, 2008). Final ratings are calculated combining the Biliary Tract disease FI and Whole Body Impairment using the Combined Values Chart as indicated in Appendix A, pp 604-606. (American Medical Association, 2008)

By definition in Clinical Phase I, FI is 100%. Duration to follow procedures specified in ISS Medical Checklist, i.e. physical exam, vital signs, and abdominal ultrasound for the best case scenario, is estimated in 90 minutes to 2 hours. During Clinical Phase II, FI is estimated in 2 to 27%. Biliary colic lasts 4 to 6 hours (Bellows, 2005). Duration is estimated conservatively as a 0 to 24 hours observation period. In Clinical Phase III, full recovery is expected and FI is 0%. By definition EVAC and LOCL would not be expected for the best case scenario.

Worst Case Comments

Functional Impairment (FI) was derived by using the IMM severe non-space adaptation template. Biliary Tract disease ratings are based on Table 6-9, p. 120 (American Medical Association, 2008). Complex Regional Pain Syndrome – Lower Extremity (CRPS -LEI) is based on Table 16-15, p.541. The CRPS (LEI) ratings are then converted to percentage of Whole Person Impairment (WPI), which are based on Table 16-1, p 495 and Table 16-10 pp.530-531 (American Medical Association, 2008). Final ratings are calculated combining the Biliary Tract disease FI and Whole Body Impairment using the Combined Values Chart as indicated in Appendix A, pp 604-606. (American Medical Association, 2008)

By definition in Clinical Phase I, FI is 100%. Duration to follow procedures specified in ISS Medical Checklist, i.e. physical exam, vital signs, intravenous antibiotics, and abdominal ultrasound for the worst case scenario, is estimated in 2 to 3 hours. During Clinical Phase II, FI is estimated in 16 to 42%. Surgery is recommended at the first open operative day or urgent, within 72 hours. (Bellows, 2005). Duration is estimated at 24 to 72 hours to prepare for EVAC. In Clinical Phase III, full recovery may or may not occur and FI is 0-42%. EVAC has occurred at least once in the Navy (Nice, 1984) and hospitalization has occurred among the astronauts corps in the ground (Johnston, 2008). LOCL is not expected; therefore the rate is 0% for this scenario.

Untreated Best Case Comments

Functional Impairment (FI) was derived by using the IMM severe non-space adaptation template. Biliary Tract disease ratings are based on Table 6-9, p. 120 (American Medical Association, 2008). Complex Regional Pain Syndrome – Lower Extremity (CRPS -LEI) is based on Table 16-15, p.541. The CRPS (LEI) ratings are then converted to percentage of Whole Person Impairment (WPI), which are based on Table 16-1, p 495 and Table 16-10 pp.530-531 (American Medical Association, 2008). Final ratings are calculated combining the Biliary Tract disease FI and Whole Body Impairment using the Combined Values Chart as indicated in Appendix A, pp 604-606. (American Medical Association, 2008)

During Clinical Phase II, FI is estimated in 16 to 42%. Duration is 0 to 24 hours, similar to the treated best case scenario. In Clinical Phase III, recovery may or may not occur and FI is 0-27%. Based on pain, EVAC is estimated in 0 to 100% for the untreated best case. By definition LOCL is not expected for this scenario.

Untreated Worst Case Comments

Functional Impairment (FI) was derived by using the IMM severe non-space adaptation template. Biliary Tract disease ratings are based on Table 6-9, p. 120 (American Medical Association, 2008). Complex Regional Pain Syndrome – Lower Extremity (CRPS -LEI) is based on Table 16-15, p.541. The CRPS (LEI) ratings are then converted to percentage of Whole Person Impairment (WPI), which are based on Table 16-1, p 495 and Table 16-10 pp.530-531 (American Medical Association, 2008). Final ratings are calculated combining the Biliary Tract disease FI and Whole Body Impairment using the Combined Values Chart as indicated in Appendix A, pp 604-606. (American Medical Association, 2008)

During Clinical Phase II, FI is estimated in 30 to 57%. Surgery is recommended at the first open operative day or urgent, within 72 hours. (Bellows, 2005). Duration is estimated at 24 to 72 hours, similar to the treated worst case scenario. In Clinical Phase III, without available treatment, FI remains 30-57%. EVAC is expected at 100% LOCL is not expected; therefore the rate is 0% for this scenario.

Treatment and Options Level of Evidence (LOE)

The IMM level of evidence appropriate assessment of the quality of the IMM input data. Since IMM incorporates input data from a wide variety of sources including astronaut population, terrestrial or analog populations, and external models, an innovative approach to assess the quality of input data was required. Information obtained from the astronaut population and/or space flight is the more relevant so it is assigned the highest level of evidence and less relevant data sources are assigned a lower level of evidence.

Citation	LOE Value	LOE Category
American Medical Association, 2008	3	FI
American Medical Association, 2008	3	FI
American Medical Association, 2008	3	FI
Bellows, 2005	4	BCWC
Nice, 1984	2	EVAC
Johnston, 2008	2	EVAC

Additional Comments

PubMed was searched using the keywords: Biliary colic OR cholecystitis incidence and cholecystitis AND epidemiology.

The Resource Table (RT)

Resource	Units Required Best Case	Units Required Worst Case	Units Available At Start Of Mission	Consumable	Essential	Rationale
Blood Oximeter	1	1	1	No	Yes	To monitor VS
Blood Pressure Cuff (regular, large)	0	1	2	No	Yes	Measure blood pressure
Blood Pressure Monitor	0	1	1	No	Yes	Measure blood pressure
BZK wipes	3	12	60	Yes	No	Cleanse skin.
CMRS	0	1	1	No	No	Restrain crew member to ensure safety
Dilaudid (Hydromorphone) 2mg/mL, 1mL syringe	0	6	18	Yes	Yes	For pain treatment without administration of oral meds
ECG Monitor (Device, USB Charge Cable, Lead Set Cable, Cue Card)	1	1	1	No	Yes	Measure and monitor ECG
Ertapenem 1gm	0	6	6	Yes	Yes	Treatment of infection
Gauze pads (4x4)	0	2	50	Yes	No	To collect IV drops or blood on skin as needed
IV administration set	0	1	3	Yes	Yes	To connect IV fluids to catheter
IV Cap	0	1	5	Yes	No	To attach IV fluids to Y-type catheter
IV Catheter (18G, 20G, or 22G)	0	1	14	Yes	Yes	IV fluid administration
IV Fluid 1L (1000mL)	0	4	5	Yes	Yes	Hydration
IV Fluid Air Filter	0	1	3	Yes	No	To filter air from IV set
IV pressure infuser	0	1	1	No	No	To infuse IV fluids
Lidocaine (Xylocaine) plain 1%, 10mL multi dose vial	0	6	3	Yes	Yes	Anesthetic for ertapenem injection
Medical tape	0	0.2	5	Yes	No	To secure needle and/or IV tubing
Needle (23G)	3	16	20	Yes	Yes	For medication administration and flushing IV
Nitrile gloves (large, medium, and small) (pair)	1	1	30	Yes	No	Personal protective equipment for CMO, to avoid contact with blood
Pack of 12 ECG electrodes	1	1	5	Yes	Yes	Measure and monitor ECG
Promethazine (Phenergan) 25mg/mL 1 mL injectable	0	12	24	Yes	Yes	Nausea relief
Sharps container	1	1	40	No	No	Used needles disposal to ensure safety
Stethoscope	1	1	2	No	Yes	Check bowel sounds
Syringe (3cc)	3	16	20	Yes	Yes	To flush catheter and/or administer medications.

Resource	Units Required Best Case	Units Required Worst Case	Units Available At Start Of Mission	Consumable	Essential	Rationale
Thermometer	1	1	1	No	No	To verify if fever is present
Toradol (Ketorolac) 30mg/mL, 2mL single dose vial	3	3	3	Yes	Yes	Pain relief (first line)
Tourniquet	0	1	1	No	No	To decrease blood flow and make vein bulge
Ultrasound gel (2 packets)	2	2	17	Yes	Yes	To enable use of U/S
Ultrasound machine	1	1	1	No	Yes	To assess abdomen

Resource Comments

Biliary colic and acute cholecystitis are not included in the ISS Medical Checklist (International Space Station Integrated Medical Group, 2008).

The resources included in the table are available on board and are based in terrestrial standards of care (Strasberg, 2008) and clinical guidelines (Solomkin, 2003).

Required Resources Level of Evidence (LOE)

The IMM level of evidence appropriate assessment of the quality of the IMM input data. Since IMM incorporates input data from a wide variety of sources including astronaut population, terrestrial or analog populations, and external models, an innovative approach to assess the quality of input data was required. Information obtained from the astronaut population and/or space flight is the more relevant so it is assigned the highest level of evidence and less relevant data sources are assigned a lower level of evidence.

Citation	LOE Value	LOE Category
Strasberg, 2008	3	Resources
Solomkin, 2003	3	Resources

Level Of Evidence

Input Data	LOE Average
Incidence	1.66666666666667
Functional Impairment	3
Best Case / Worst Case	4
EVAC / LOCL	2
Resources	3
QUALITY OF EVIDENCE	**2.73333333333333**

Description	Range
Excellent	1-2
Good	2.1-3
Fair	3.1-4
Poor	4.1-5

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