



## “A PROSPECTIVE STUDY OF FACTORS AFFECTING POST OPERATIVE MORBIDITY AND MORTALITY FOLLOWING ABDOMINAL SURGERY IN ELDERLY

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### ABSTRACT

The term 'ageing' is related to word 'senescence' although term aging commonly used to refer post maturational process that are deteriorative and lead to increased vulnerability.

However, a set of common characteristics of ageing can be identified in mammals. There are many theories of ageing, currently one theory with much emphasis is "oxidative stress model". In this hypothesis, oxygen derived free radicals formation with in the cells causes protein damage by oxidation and the pool of damaged enzymes progressively increase in size with increased age.

The ageing process affects all organ systems, with varying functional sequelae that can negatively impact upon the elderly patient to surgical stress. It is important to recognize the physiological changes that occur in heart, lungs, kidneys, brain and GIT with ageing that produce no functional impairment under non stressful conditions. However, with increased stress in the elderly patients response to demand is greatly impaired owing to diminished reserve capacity.

**AIMS and OBJECTIVES :** To Study the commonest complications that contributes to the morbidity and mortality after abdominal surgery in elderly.

To consider preventive measures that can be adopted to minimize morbidity and mortality in elderly.

**MATERIALS and METHODS :** This study was conducted in department of surgery at P.B.M. Hospital attached to Sardar Patel Medical College, Bikaner. All the cases were above 60yrs who underwent elective and emergency abdominal surgery between 1 Jan 2005 to 31 Dec 2005 were studied. Elective operations were performed on 56 patients and 54 patients had emergency procedure.

**Summary and conclusion :** Co-morbid illness, ASA grading, diagnosis, emergency procedure, duration of operation and late recovery after operation are common factors leading to increased mortality and morbidity after abdominal surgery in elderly. age, sex, nature of surgery does not influence morbidity and mortality in elderly.

**KEYWORDS :** Ageing, Deteriorative, Maturational, Oxidative.

### INTRODUCTION

The term 'ageing' is related to word 'senescence' although term aging commonly used to refer post maturational process that are deteriorative and lead to increased vulnerability.

- **Increased mortality with age after maturation**—mortality from various causes, including diseases, increases exponentially with age, but significant improvement in medical care as well as public health measures have been largely responsible for reduction of early mortality and increase in average life span.
- **Change in biochemical composition in tissues with age** – Numerous molecular markers of ageing have been described in various tissues from various organisms. Like Lipofuscin, age pigment and increased cross linking in extracellular matrix molecules. Other examples, including age related changes in the rate of transcription of specific genes, alteration in the rate of protein synthesis and numerous age related changes in post translation protein modifications.
- **A broad spectrum of progressive deteriorative physiological changes with age** – Numerous physiological changes including declines in GFR, maximum heart rate, vital capacity and other measures of physiological performances.

### AIMS and OBJECTIVES

To Study the commonest complications that contributes to the morbidity and mortality after abdominal surgery in elderly.

To consider preventive measures that can be adopted to minimize morbidity and mortality in elderly.

To evaluate preoperative risk factors, that enhance morbidity and mortality after abdominal surgery in elderly.

To study co-morbid disease; which contributes high morbidity and mortality rate after abdominal surgery in elderly.

To evaluates the influence of age on postoperative complications and length of hospital stay.

Comparison of morbidity and mortality in elderly in elective versus

emergency abdominal surgery.

### MATERIALS and METHODS

This study was conducted in department of surgery at P.B.M. Hospital attached to Sardar Patel Medical College, Bikaner. All the cases were above 60yrs who underwent elective and emergency abdominal surgery between 1 Jan 2005 to 31 Dec 2005 were studied. Elective operations were performed on 56 patients and 54 patients had emergency procedure.

### OBSERVATION

#### Demographics:-

108 patients of 60 years or over who had abdominal operations were studied at PBM hospital, Bikaner in Surgery department one year period from 1 January 2005 to 31 December 2005. 69 patients were male and 39 patients were female. Mean age was 64.95 years (60-85). Elective operations were performed on 56 patients and 54 patients had emergency procedures. 54 patients passed uneventfully with no recorded complications and other 54 patients experienced 72 complications. The most common were wound infections and chest complications. 18 patients expired and the most common cause of death was multiple organ failure with septicemia. Mean hospital stay was 15.2 days and mean postoperative stay was 10.25 days.

In this study, 70 cases were 60-69 years age group, 32 cases were 70-79 years age group and 6 patients were of 80-89 year age group. No patient was observed more than 90 years age group.

Maximum mortality rate was observed in 70-79 years age group 18.75% (6 deaths) followed by 80-90 year 16.66%(1 death), 60-69 year 15.71% (11 deaths). P value and chi square value according to mortality in different age groups was not significant.

Maximum morbidity was observed 80-89 age group, 88.33%(5 case) Morbidity present in 60-69 years age group was 48.57% (34 case) followed by 46.87% (15 case) in 70-79 years age group. P value and chi square value according to morbidity in different age group was not significant.

Maximum mean hospital stay was observed in 60-69 years age group

16.2 days (2-43) followed by 70-79 year age group 15.3 days (1-35) and 14.8 days (10-25) in 80-89 years age group.

Mean postoperative stay in 60-69 years age group was 10.45 days, 70-79 year age group was 13 days and 80-89 years age group was 12.6 days.

### SEX

In 108 patients, 69 were male and 39 were female

**Male :** Female ratio 1.76 : 1

Mortality rate was higher in male 18.8% (13 cases) compared to female 12.8% (5 cases) (P value > 0.05, Chi square value = 0.650).

Morbidity rate was seen 53.62 % (37 cases) in male and female had morbidity rate 43.58% (17 cases) (P value > 0.05, Chi square value = 1.003)

On univariate analysis mortality and morbidity does not depend upon sex.

Mean hospital stay was more in female 16.7 days than males 14.2 days.

Mean Postoperative stay in male was 11.8 days and 9.8 days in female.

### DIAGNOSIS:

Out of 108 cases, 89 patients were of benign pathology and 19 patients were diagnosed malignant pathology.

Mortality was higher in malignant cases 26.3% (5 cases) as compared to 14.6% (13 cases) in benign pathology. (P value > 0.05, Chi square value 1.545)

Morbidity was higher in malignant pathology 52.3% (10 cases) as compared to 49.83% (41 cases) in benign pathology. (P value > 0.05, Chi square value 0.064)

After multiple logistic regression, There was no significant difference in mortality and morbidity between benign and malignant pathology.

In 108 patients, 28.7% (31 cases) were admitted for peptic ulcer related complications and bowel perforation from malignant or benign causes 24.07% (26 cases) were admitted for bowel obstruction from benign and malignant causes. Other causes of admission were 31.48% (34 cases) for biliary disease, 4.6% (5 cases) from colorectal neoplasia, 2.7% (3 cases) non specific pain abdomen, 2.7% (3 cases) for liver or pancreatic disease, 1.85% (2 cases) for urinary disease, 0.92% (1 Case) for acute appendicitis and 2.7% (3 cases) for miscellaneous causes.

### PREOPERATIVE RISK FACTOR

In 108 patients, 31 patients had no co-morbid illness, they had 32% mortality (1 case) and 16.12% (5 cases) morbidity while patients with comorbid illness (77 patients) had mortality 22% (17 cases) and morbidity 63.36% (49 cases) Mortality rate between normal patients and patient with co-morbid illness was significant (P < 0.05, Chi square value 5.656). Morbidity rate between normal patients and patients with co-morbid illness was highly significant. (P value < 0.001, Chi square value 19.953).

Mean Hospital stay in normal patients was 13.7 days and patients with co-morbid illness was 16.5 days.

Mean post operative stay in normal patients was 11 day and patients with co-morbid illness 10.46 days.

In 108 cases, 32 patients had no concomitant disease, 49 patients had 1 risk factors, 16 patients had 2 risk factors and 12 patients had 3 or more risk factors.

Mortality, in patients who had no concomitant disease was 3.2% (1 case), 12.2% (6 cases) who had one risk factor, 31.2% (5 cases) who had 2 risk Factors and 50% who had 3 or more risk factor.

Morbidity was maximum in patients who had 3 or more risk factor 91.66% (11 cases) followed by 62.5% (10 cases) who had 2 risk factors, 58.33% (28 cases) who had 1 risk factors and 28.12% (5 cases) who had no risk factor.

Mortality and Morbidity is directly proportional to the number of concomitant diseases.

Mean Hospital stay was highest in patients having one risk factor 17.4 days, followed by patients having 2 risk factors 16.6 days, and 13 days in patients having 3 or more risk factors.

Mean postoperative stay was maximum 11.8 days in patients having one Pre-operative risk factor followed by 11 days in patients having no risk factor, 8.8 days in patients having 2 risk factor and 9.2 days in patients having three or more risk factors. Out of 108 patients, 105 had preoperative risk factors and most common pre operative risk factor was chronic respiratory disease (25.17%), valvular heart disease (20%) and anaemia (18%). Other were hypovoloumia, hypertension, jaundice, diabetes, malnutrition, electrolyte imbalance and acute respiratory disease.

### DURATION OF OPERATION

According to duration of operation, In 108 patients, 48 patients were operated within 60 min, 34 patients were operated between 60-90 min and 26 patients were Operated taking more than 90 min.

Maximum mortality was seen in patients in whom duration was duration more than 90 min 30.76% (8/26 cases), followed by 14.7% (5/34 cases) in 60-90 min group and 10.41% (5/48 cases) in less than 60 min. group.

Morbidity was also higher in patient in whom duration of operation was more than 90 min (73% (19/26 cases), followed by 44.1% (15/34 cases) in 60-90 min group and 41.6% (20/48 cases) in less than 60 min. group.

Mortality and Morbidity was in increasing order in relation to duration of operation.

### RECOVERY

In 108 patients, most of the patients (98 patients) recovery occurred spontaneously and 10 patients had late recovery.

Mortality and morbidity in late recovery group were 60% (6 cases) and 100% (10 cases) respectively. While spontaneous recovery group had mortality 12.24% (12 case) and morbidity 44.89 (44 cases).

On univariate analysis, mortality was significantly high in patients with late recovery (P value 0.001, Chi square value = 14.899) and morbidity was also (P value < 0.001, Chi square value = 11.020).

### Post operative complications

In 108 patients, 72 postoperative complications were observed in 54 patients. Most common postoperative complication was wound infection 22.22% followed by chest complication 19.28%, septicemia 15.2%, acute renal failure 9.8%, postoperative hypertension 4.1% postoperative fever 4.1%, diarrhoea 4.1%, abdominal distension 2.7%, bed sore 2.7%, haemoptysis 1.3%, faecal fistula 1.3%, urinary incontinence 1.3% delirium 1.3% bile leak 1.3%, aspiration pneumonitis in 1.3%

### CAUSE OF MORTALITY

In this study, 18 patients expired, most common cause of mortality was multiple organ failure with septicemia 61.6% (11 cases) followed by cardiogenic shock 22.2% (4 cases) and other were acute renal failure, acute respiratory distress, aspiration pneumonitis.

### DISCUSSION

#### AGE

Advanced age traditionally has been considered a risk factor for surgery. Aging is associated with a decrease in functional reserves of organ systems and an increase in presence of co-morbid conditions. In our study, overall mortality rate was 16.6% and morbidity 50% in patients above 60 years old while JH William and J. Colin (1988) reviewed patients over 80, 10.1% mortality and 41% at least one serious postoperative complication. Kettunen J (1995)<sup>39</sup> reviewed patients aged over 65 years who were operated for acute abdomen, post operative morbidity was 26% and mortality rate 22%. Styruud J, Eruksson S (1999) studied 47 patients over 80 years, complication rate was 28% and mortality 18.5% respectively. Rigburg D (2000)<sup>56</sup> reviewed patients greater than or equal to 90 years of age, overall mortality 13.6% and morbidity 57% . Catena F, Gazotti F (2001)<sup>16</sup>

studied 81 patients with recurrent abdominal cancer who presented with abdominal emergency, an overall postoperative mortality was 11.1% and morbidity 27.1%. Kulah B et al (2003)<sup>35</sup> reviewed aged patients over 65 years, over all morbidity and mortality rate was 42% and 28% respectively.

Saleh Abbas and Micheal Booth (2003)<sup>60</sup> studied patients over 80 years of age and observed 30 days mortality was 19.4% and morbidity 33.3%.

In our study, mortality and morbidity rate was not linearly related to age. Mortality rate in patient of 60-69 years of age was 15.7%, in patient aged 70-79 years was 18.7% and over 80 was 16.6%. Barlow AD (1989)<sup>10</sup> noted aged patients over 74 years had twice the mortality than 65-74 years. Bufalari A (1996)<sup>9</sup> found in his study that mortality rate of octogenarians was greater than that of younger patients (65-79 years). Nishada (2000)<sup>32</sup> found mortality rate of 3.3% in 65-79 years age group, 9.8% in 80 years or older. Arnel JJ (2003)<sup>7</sup> observed that Mortality rate was 19% in patients 70-79 years age group and 24% in 80 years or older.

Our study, morbidity was higher in patients more than 80 years of age and was found to be 88.33% followed by 48.57% in 60-69 years age group and 46.87% in 70-79. years age group, which was higher than Carisi A Polanazyk (2001)<sup>18</sup> who observed that major post operative complications occurred in 5.7% in 60-69 years of age, 9.6% in patients aged 70-79 years and 12.5% in patients 80 years of age or older. In hospital mortality was significantly higher in patients 80 years and older than those younger than 80 years of age (2.6% and 0.7% respectively).

Espinonza R (2004)<sup>23</sup> In his prospective study of 45 patients aged more than 65 years old presenting with acute abdomen in emergency. In this series biliopancreatic disease was (31.1%), intestinal adhesive obstruction (17.7%), complicated abdominal wall hernia (13.7%) and complicated peptic ulcer disease (8.9%) Mortality rate was 11.1% for the surgical group over 65 years of age.

#### Concomittent disease

Concomittent disease is an important factor while assessing risk of surgical intervention in elderly patients. Presence of significant cardiac, respiratory or renal disease markedly increases preoperative risk. The presence of significant disease, dementia or previous stroke or other active medical conditions such as cancer, diabetes mellitus and sepsis are important prognostic indicators.

In our study, normal patients (No co-morbid illness) had mortality of 3.2% and morbidity 16.12%. While patients with co-morbid illness had mortality 22% and morbidity 62% (P value < 0.05,  $\chi^2=5.65$ ,  $P<0.001$ ,  $X^2=19.953$ ), which was lower than Denny and Denson (1972)<sup>19</sup> who studied on 90 year or above he observed 5% mortality in normal patients and 45% in patients with co-morbid illness.

ASA status is predictor of mortality and morbidity in elderly with comorbid illness. ASA III and IV had higher mortality (55° 0) and morbidity (90%) than ASA I and II with mortality (7.9%) and morbidity (40.9%) respectively.

Hosking et al (1989)<sup>26</sup> noted in series of 795 patients over the age of 90, mortality rate of 17.4% after emergency operation and 6.8% in elective Operation. Perioperative morbidity was significantly higher in emergency group 20.7% and 7.5%. JH William and J Colin (1989)<sup>31</sup> studied patients aged 80 year and elders, the overall mortality rate was nil for patients admitted for elective general procedures and 21.6% admitted for emergency surgery. Hirashima T (1992)<sup>27</sup> reported that patients over 60 years of aged had mortality rates significantly higher in emergency group (11.9%) as compared to mortality rate in elective abdominal surgery group (3.8%). Madson MR (1993)<sup>44</sup> studied thatin patients aged 80 years or more, emergency operation significantly increased both morbidity and mortality, which varied from 8% and 0% respectively after elective laprotomy, as compared to 71% and 39% after emergency Operations. Akoh IA (1994)<sup>4</sup> reported 30 days mortality rates for elective and emergency Operations to be 11% and 25% respectively with in 30 days. Cheng KW (1994)<sup>7</sup> studied retrospectively in 294 patients aged 80 and Older.

Mortality rate were 13.8% in emergency group and 2.5% in elective group. Roseano M (1997)<sup>57</sup> studied patients aged 70 years and over,

the overall mortality rate was 600 after elective surgical treatment and 48% in emergency surgery. AsCanelli S. Navarra G (2003)<sup>7</sup>, reported that 30 days operative mortality was higher in emergency group (11.9%) as compared to elective group (3.4%) The 30 days Operative morbidity was also Observed higher in emergency group (27%) as compared to elective group (127° 0) Crondon IW (2005)<sup>17</sup> analysed in patients aged 60 years or Older, the overall mortality was 3.7% in elective groups and 13.5% in emergency groups.

In our study mean post operative stay was 10.2 days while Micheal Booth and Sahel Abbas (2001)<sup>60</sup> reported median post operative stay was 12 days for patients aged 80 years and above.

In emergency group post operative stay was 10.8 days and 10.4 days in elective group. Keller (1987)<sup>44</sup> reported all geriatric patients operated on under emergent condition, post operative hospitalization was often prolonged when compare to elective group. Mean postoperative stay was longer 11.7 days in patients with post operative complications than patient without postoperative complication 10.4 days.

#### Summary and Conclusion

The study was conducted on 108 patients more than 60 years of age who were admitted and operated in various surgical wards in PBM Hospital, Bikaner over one year period from 1 January 2005 to 31 December 2005.

All patients were above 60 years. Mean age was 64.5 ears (60-85). . . VFW""? L222 Omar Mortality wa fo'und almost same In 6 -69 year (15.70 0), 70-79 years 18.70 0) or 80 years or éSlider (1 .20 o). Morbidity was higher in patients aged 80 or older (83.30 0) than 70-70 years (46.87° o) and 60-69 years (48.50 o). On univariate analysis, age does not influence morbidity and mortality in elderly. Advanced age is not a contraindication to surgery but the need for careful preoperative evaluation and vigorous post operative support of the patients is required.

There were 69 male patients and 39 female. Mortality and morbidity were higher in males. On univariate analysis, sex does not influence mortality and morbidity in elderly. It depends upon pre-anesthetic risk factor, co-morbid illness and severity of surgery.

89 patients had benign pathology and 19 patients were diagnosed to have malignant pathology. Malignant pathology had higher mortality than benign pathology (26.30 0 Vs 14.60 o) and morbidity (52.30 0 Vs 49.30 0).

Most common diagnosis was Biliary disease (31.40 0) followed by peptic ulcer related complications and bowel perforation (28.70 o), Bowel obstruction (24° 0), colorectal neoplasia (4.620 o) and non-specific pain abdomen (2.70 0).

Mortality (220 0) was higher in patients with co-morbid illness as compared to (3.20 o) mortality in patients in normal groups. Similarly morbidity in patients with co-morbid illness (63.360 0) was higher compared to morbidity in normal group (16.12° 0) mean hospital stay in patients with co-morbid illness group was higher (16.5 days) as compared to normal group (13.7 days). It indicates co-morbid illness is directly related to mortality and morbidity.

The common Pre-operative risk factors were chronic respiratory disease (25.710 0), valvular heart disease and anaemia (18° 0).

The mortality and morbidity is directly related to ASA grading. ASA III and IV had higher mortality 55° 0 and morbidity 9000 than ASA I and II 7.9% and 40.900 0 respectively.

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