

## Research Article

# Quality of Life after Damage Control Laparotomy for Trauma

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Received: November 13, 2017; Accepted: December 05, 2017; Published: December 12, 2017

## Abstract

**Introduction:** Though short term survival advantage of damage control laparotomy in management of critically ill trauma patients is established, there is little known about the long term quality of life of these patients. Facial closure rate after damage control laparotomy is reported to be upto 60 percent. Abdominal wall reconstruction in those who failed to achieve facial closure is challenging and can potentially affect quality of life of these patients.

**Objectives:** To compare quality of life of abdominal trauma patients managed by damage control surgery to quality of life of those abdominal trauma patients in whom single definitive laparotomy was done.

**Methodology:** We conducted retrospective matched cohort study. Adult patients who underwent damage control laparotomy from Jan 2007 till Jun 2015 were identified through medical record. Patients who had concomitant disabling brain injury or limb injuries requiring amputation were excluded. Age, gender and presentation time matched patients who underwent laparotomy for trauma but no damage control were identified for each damage control laparotomy patient. Quality of life assessment was done via telephonic interview at least one year after the operation using Urdu version of EuroQol Group Quality of Life (QOL) questionnaire EQ5D.

**Results:** Out of 32 patients who underwent damage control laparotomy during study period, 20 fulfilled the selection criteria. Median age of patients was 33 (26-40) years. Facial closure rate in damage control laparotomy group was 40% (8/20). Self-reported QOL score of damage control laparotomy patients was significantly worse than non-damage control group (Median 78.1 vs. 86.4,  $p = 0.032$ ). There was no statistically significant difference in two groups regarding individual QOL dimensions. Significantly more patients in damage control group were requiring use of abdominal binder, and more patients in damage control group had to either change their job or had limitations in continuing previous job.

**Conclusion:** Quality of life of damage control patients is worse than their age and gender matched patients who underwent trauma laparotomy but not damage control.

**Keywords:** Damage control laparotomy; Laparostomy; Quality of life

## Introduction

There is a paradigm shift in the management of trauma patients with multiple injuries [1]. It is now well recognized that these patients die more because of metabolic failure than failure of operative procedure as such [2]. Metabolic failure in terms of coagulopathy, hypothermia and metabolic acidosis once sets in, leads to a vicious cycle which is known to be associated with high mortality. Widespread acceptance of Damage Control Surgery (DCS) over past two decades has revolutionized the management of these patients. DCS involves a sequence of initial operative damage control phase, followed by resuscitation phase in intensive care unit (ICU) and finally definitive operative repair [3]. Principles of first operation are hemorrhage control, contamination prevention and prevention from further injury. After abdominal packing and temporary wound closure, patient is shifted to ICU where resuscitation is done and metabolic derangements are corrected. Reoperation is done at an interval of 48

to 72 hours. At the time of reoperation, abdominal packs and clots if any are removed and definitive repairs are done. There is usually significant edema of bowel wall and abdominal wall at the time of second operation due to inflammatory response, reperfusion injury and crystalloid resuscitation. This makes primary closure of sheath difficult in upto 40% of patients [4,5]. Furthermore sheath dehiscence is not uncommon where primary closure was achieved. In such a situation an absorbable mesh is sutured to the sheath. These patients later have large ventral hernias [6]. Though later repair of these hernial defects is an option, repair is challenging. Abdominal wall reconstruction is frequently required [7]. Bowel wall is adherent to the skin over defect and there is loss of abdominal domain. A good fraction of these patients have no other option but to live with these hernias and abdominal binder for rest of their lives. Though survival advantage of damage control surgery in multiple trauma patients is established, little is known about quality of life (QOL) of the trauma patients who survived after damage control surgery.

## Objectives

To compare quality of life of abdominal trauma patients managed by damage control surgery to quality of life of those abdominal trauma patients in whom single definitive laparotomy was done.

## Material and Methods

### Study design

We conducted a matched cohort study. As objective of the study was to look at long term quality of life in patient who survived the initial trauma, comparison group was not selected based upon severity of injury. Rather it was selected based upon age and gender of patients. We took patients who underwent trauma laparotomy and did not require damage control as control so that psychological impact of trauma on quality of life could be balanced in both groups.

### Matching

Information regarding details of laparotomy in trauma patients was gathered from medical record. Patients identified to have undergone damage control laparotomy were identified. Age and gender matched controls were selected from the medical record who had undergone trauma laparotomy but not damage control. Controls were selected within 5 years of date of presentation of case.

### Selection criteria

Adult trauma patients of age 16 years and above, who underwent laparotomy as part of their management from Jan 2007 till Dec 2015 was eligible for the study.

### Exclusion criteria

- Death during index hospitalization.
- Initial phase of damage control surgery done outside our hospital and then referred for further management.
- Patients having traumatic brain injury.
- Patients having limb injuries sever enough to end up in amputation.
- Refusal to grant informed consent to participate in the study.

### Quality of life questionnaire

Health-related quality of life was measured using the EuroQol-5 Dimensions (EQ-5D) questionnaire [8]. This is a standardized instrument that measures five health dimensions (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression), each scored from 1 (no problem) to 3 (severe problems). In addition, a visual analogue scale, ranging from 0 to 100, provides a global rating of health status. Lower score on this scale indicates poorer overall quality of life. Comparison was made between control group and cases. Lower scores indicated poorer health-related quality of life. An Urdu-language version of the EQ-5D is available and was used after due permission from EuroQol group.

In addition to the quality of life questionnaire, we collected data on continued need to use abdominal binder and need to change the profession due to factors related to surgical intervention.

### Sample selection and data collection

Ethical approval was sought from institutional ethical review

committee (ERC) before start of the study. ERC approval number is 1996-Sur-ERC-11. All the patients eligible for the study were contacted via telephone using the last known contact information. After greeting and self-introduction, information was acquired about the health of the patient. If the patient was available, he/she was told briefly about the research project and was requested to come to clinic for the follow up. On the other hand, in case of death of the patient, contact person was sympathized and apologized for any disturbance. EQ-5D questionnaire was administered in person on clinical follow up where ever possible or via telephonic interview in case clinical follow up was not the possible option. Verbal consent was taken for telephonic interview. In case of no response to all contact information available, patient was deemed lost to follow up or dead. Trauma registry, operating room case log and chart review were used for relevant data collection on a specifically designed questionnaire to collect details of patients' demographics including age, gender, admission diagnosis, mechanism of injury, and presence of intra-abdominal hypertension (IAH) risk factors. Indications for Open Abdomen and any subsequent abdominal complications like infection, wound dehiscence, incisional hernia formation, fistula formation and abdominal compartment syndrome were recorded. Time to temporary closure and time to definitive closure (primary fascial repair) were recorded.

### Statistical analysis

Statistical analysis was done using SPSS version 19 [9]. Quantitative variables have been reported as means  $\pm$  standard deviations or medians with interquartile ranges depending upon distribution of data. Qualitative variables have been reported as numbers, proportions and percentages. Matched odds ratios were calculated using McNemar test for five individual dimensions in quality of life questionnaire. Visual analogue scale score was compared using Wilcoxon Matched Pair Signed Rank Test. P value of less than 0.05 was considered significant.

## Results

There were a total of 32 patients who underwent damage control laparotomy during study period, out of which 20 fulfilled the selection criteria. For these 20 cases, 20 matched controls were selected. Median age of patients in damage control group was 33 (IQR: 26-40) years out of which 17 (85%) were males. Most common mechanism of injury was gun-shot. 17 patients suffered from this, while stab abdomen, road traffic accident and fall from height were the underlying mechanism in one patient each. Mean follow up was 46  $\pm$  12 months. Facial closure rate in damage control laparotomy group was 40% (8/20). One third of those who did not achieve facial closure (4/12) underwent abdominal wall reconstruction later while rest of them could not get any treatment for their planned ventral hernia.

Self-reported QOL score of damage control laparotomy patients was significantly worse as compared to non-damage control group (Median 78.1 vs. 86.4,  $p = 0.032$ , Wilcoxon Matched Pair Signed Rank Test). There was no statistically significant difference in two groups regarding any of the individual dimensions of QOL questionnaire (Table 1). Significantly more patients in damage control group had to use of abdominal binder routinely, and more patients in damage control group had to either change their job or had limitations in

**Table 1:** Impact of damage control surgery upon individual EQ5D dimensions (McNemar test).

Parameter	Matched Odds Ratio	P Value
Walking	0.50	1.00
Self Care Taking	1.00	1.00
Daily Routine Activities	1.33	1.00
Pain / Restlessness	1.00	1.00
Tension / Anxiety	1.67	0.73

**Table 2:** Impact of damage control surgery upon other outcome measure.

Parameter	Test Used	Matched Odds Ratio	P Value
Use of Abdominal Binder	Mc Nemar Test	9.00	0.001
Change of Job post Operatively	Mc Nemar Test	7.00	0.07

continuing previous job (Table 2).

## Discussion

Survival advantage of damage control laparotomy in critically ill polytrauma patients is established. But at the same time low rate of facial closure leading to complex ventral hernias leave a large fraction of patients with no other choice but to learn to live with it. Our experience shows that two third of patients who were managed as planned ventral hernia, never happened to get their hernia fixed. Moreover abdominal wall hernias are known to adversely impact quality of life [10]. Though we did not have enough sample size to look causative factors of poor quality of life after damage control laparotomy, more proportions of patients living with hernia and requiring routine use of abdominal binder are probably the underlying factors responsible for our findings.

Achieving early facial closure can potentially be the solution to avoid complex hernia formation and hence improving quality of life [11]. Though there is not conclusive evidence as yet, use of 3% hypertonic saline is reported to help in achieving up to 100% primary facial closure rate after damage control laparotomy [12].

Our study has also highlighted an important point that patients after damage control surgery had significantly more problem with their profession. Though global rating of overall health was significantly worse after damage control laparotomy, five health dimensions with measured mobility, self-care, usual activities, pain/discomfort, and anxiety/depression were not different. These points towards a different perspective of health and quality of life in our society. Despite daily routine not being affected overall health is rated poor. Part of it could be because of impact on profession. This phenomenon has been demonstrated by other authors as well whereby disability affecting income is known to affect sense of well-being [13].

This is relatively untouched area in literature and to the best of our knowledge this is first report to look into quality of life in those who survived after damage control laparotomy.

## Conclusion

Quality of life of damage control patients is worse than their age and gender matched patients who underwent trauma laparotomy but not damage control. Complex ventral hernias and difficulties in performing jobs could be the underlying causes.

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