

## ORIGINAL RESEARCH

**To compare the post-operative outcome and patient's satisfaction of ultrasound guided minimally invasive techniques with conventional incision and drainage in breast abscess management.****Dr. Prashant Pandey<sup>1</sup>, Dr. Madhulika Mishra<sup>2</sup>**<sup>1</sup>Associate Professor, Department of General Surgery, Hind Institute of Medical Sciences, Safedabad, Barabanki, India<sup>2</sup>Associate Professor, Department of Obstetrics and Gynaecology, Hind Institute of Medical Sciences, Safedabad, Barabanki, India**Corresponding author**

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Associate Professor, Department of Obstetrics and Gynaecology, Hind Institute of Medical Sciences, Safedabad, Barabanki, India, [Email:frcsmadhu@gmail.com](mailto:frcsmadhu@gmail.com)**Abstract:****Background:** Breast abscess is most dreaded complication of mastitis more common in lactating mothers. The etiology behind mastitis to convert into breast abscess occurs in the setting of the breastfeeding problems which typically result in prolonged engorgement or poor drainage. Aim of the study was to compare ultrasound guided minimally invasive techniques with conventional incision and drainage in breast abscess management.**Material & Methods:** The present prospective cohort study was conducted in department of surgery UPUMS Saifai, Etawah, Uttar Pradesh. A total of 90 females patients diagnosed as a breast abscess either clinical and/or ultrasound were enrolled in this study and randomly divided in two groups. Group 1 was treated by conventional incision and drainage. Group 2 was treated by ultrasound guided minimally invasive techniques.**Observation:** Bleeding and dressing were significantly more time need in group 1 ( $p < 0.05$ ). in our study 68.2% patients were lactating. Amount of pus was comparatively greater observed in group 2 but it was also statistically insignificant. The requirement of analgesia during the post intervention was significantly more amount and time in group 1 in compare to group 2 ( $P < 0.05$ ). The group 2 patient significantly early recovered than the group 1 ( $P < 0.05$ ). Recurrence and failure procedure was not reported in this study. Cosmese were excellent in 93.3% cases in group 2; while in group 1 excellent was only 40.0% cases.**Conclusion:** USG guided minimally invasive techniques combined with antibiotics has a great value in the treatment of breast abscess even in abscess with large volume. Patient's satisfaction and Cosmese was excellent in ultrasound guided minimally invasive techniques.**Keywords:** Breast abscess, Needle aspiration, Incision and drainage.**Introduction:**Breast abscess is a one of the commonest forms of abscess surgical emergencies usually in lactating women.<sup>1</sup> The frequency of occurrence is highly related to breast feeding mainly due to nipple bite by a child during feeding and bacterial colonization as a result of improper nursing technique and incomplete emptying of the breast.<sup>2</sup> Formation of an abscess may be preceded by a

period of generalized inflammation of the breast (mastitis) secondary to stasis of milk in the breast.<sup>3</sup> The bacteriology of breast abscesses has been studied in the past, identifying *Staphylococcus aureus* as the predominant bacterial isolate.<sup>4,5</sup>

Acute inflammation of the breast usually occurs in lactating women and to a lesser extent in non-lactating women that is attributed to the increased activity of the breast tissue in response to female hormones. It may range from mild superficial mastitis to deep abscess. The frequency of breast abscess is quite high in India generally related to pregnancy. Non-lactation breast abscess is not as common in our country as in the western countries. Early diagnosis and treatment of mastitis is the key to avoiding complications.<sup>6</sup> The traditional treatment of breast abscess is by surgical incision and drainage i.e. evacuation of contents with occasional placement of surgical drains and administration of systemic this often require general anesthesia may leave unpleasant scars, is more expensive, requires regular post-operative change of dressing and interferes with lactation.<sup>6,7</sup>

Ultrasound has been shown to be useful in the diagnosis of breast abscess, guiding needle during aspiration and also enables visualization of multiple abscess loculi and is thus useful in guided aspiration of breast abscess.<sup>8</sup> This procedure is now being used widely with successful outcome in the breast abscess patients and is associated with less reoccurrence rate, excellent cosmesis and also fewer costs.<sup>9</sup> A recently highlighted approach is drainage of pus by percutaneous drain placement under antibiotic cover.<sup>10</sup> This approach has advantages of being almost painless, complete resolution without scar formation and mothers can continue breast feeding.

The aim of this study was to ultrasound guided minimally invasive techniques with conventional incision and drainage in breast abscess management.

### **Material & Methods:**

The current prospective cohort study was conducted in department of surgery UPUMS Saifai, Etawah, Uttar Pradesh between January 2018 to July 2019. A total of 90 females all age group patients diagnosed as a breast abscess either clinical and/or ultrasound were enrolled in this study. Patients with chronic abscess with skin changes and malignancy/ tuberculosis/ suspicious lesions were excluded from the study.

A primary ultrasonography of the breast was done at the time of admission for abscess size, location and number. Enrolled 90 patients were divided in to two random groups of 45 patients each by using random number tables. Group 1 was treated by conventional incision and drainage. Group 2 was treated by ultrasound guided minimally invasive techniques. Routine blood investigations like, CBC, renal function test and coagulation profile (Bleeding time, Clotting time, Prothrombin time), random blood sugar were done. Pus culture and sensitivity was sent in all patients before the initiation of antibiotics.

For **Group 1** incision and was sited in a radial direction over the affected segment, although if a circumareolar incision was allow adequate access to the affected area this preferred because it gives a better cosmetic result. The incision passed through the skin and superficial fascia. A long artery forceps was then inserted into the abscess cavity. Every part of the abscess was palpated against the point of the artery forceps and jaws were opened. All loculi that could be felt were entered. Finally the artery forceps having been withdrawn, a finger was introduced and any remaining septa disrupted. The pus was the evacuated and the loculi broken down digitally. The cavity was lavaged with hydrogen peroxide, povidone iodine solution and saline. The wound was then lightly packed with ribbon gauze or a drain inserted to allow dependent drainage.

For **Group 2** minimally invasive the techniques done under ultrasound guidance maintaining all aseptic precaution and using a 16G needle and 10 or 20 ml syringe (if size was less than 5cm, it was managed via ultrasound guided aspiration) / 14-16 number suction drain (if more than 5cm then by percutaneous suction drain placement).

Post intervention all patients were given oral antibiotics as per standard institution protocols. Patients were discharged when comfortable on tablet Diclofenac 50mg orally, 8 hourly and tablet Co-Amoxiclav 625mg orally, 8 hourly for a total of seven days. Follow up was done twice weekly until complete healing of abscess and after one month of complete healing.

The patients were assessed in the post intervention period: presence of fever, decrease in leucocyte count, pain score (reading on visual analogue scale VAS 0 to 10), number of aspirations required in the needle aspiration group, number of days of dressing required, duration of hospital stay, ease of breast feeding, healing, recurrence, cosmesis and patients satisfaction (Likert questionnaire).

The data obtained were analyzed using SPSS software version 23.0 for Windows (SPSS, Chicago, IL). Categorical data are presented as the percent frequency occurrence. To test the association / difference in proportions between the variables, Chi-square test / Fisher exact test was used. The means of quantitative variables were compared using both independent sample t-test. P value <0.05 was considered as statistically significant.

### **Observation & Result:**

Group 1 patients were treated by conventional incision and drainage and group 2 was treated by ultrasound guided minimally invasive techniques. Patients characteristics like age, parity, side and site involved, lactating status and breast suppression were comparable in both groups ( $p>0.05$ ) (**Table No. 1**). We noticed that out of total 90 patients sixty two (68.9%) patients were lactating and out of that lactating female having a Staph aureus infection. USG guided aspiration in 25 (56.6%) patients in group 2 (**Figure No. 1**); in which 8 (32.0%) of patients require single aspiration and 17 (68.0%) patients require two times needle aspiration for complete resolution. And no need for three times aspiration, as in our study complete resolution was occurred after single/two times aspiration (as we choose the patients in which the greatest dimension of abscess cavity was <5cm).

Bleeding and dressing were significantly more time need in group 1 ( $p<0.05$ ); and out of 90 study female 56 (62.2%) female having a Staph aureus infection. Amount of pus was comparatively greater observed in group 2 but it was also statistically insignificant ( $p>0.05$ ) (**Table No. 2**).

We noticed the requirement of analgesia during the post intervention was significantly more amount and time in group 1 in compare to group 2 ( $p<0.001$ ). Fever and return to normal TLC was comparable in both groups ( $p>0.05$ ) (**Table No. 3**).

On applying the visual analog scale for measurement of pain intensity; our study noted the significantly greater intensity and duration of pain in group 1 (**Figure No. 2**).

Our study noted the complete recovery period occurred in minimum three days to maximum forty days. We observed the group 2 patient significantly early recovered than the group 1 ( $p<0.05$ ) (**Figure No. 3**).

Recurrence and failure procedure was not reported in this study. Cosmesis was excellent in 93.3% patients and good in 6.7% patient in group 2 while in group 1 excellent was 40.0% and good in 60.0%. we also noted the scar mark was 100.0% patient in group 1 and 100.0% patients were ease to breast feeding in group 2. At the end of follow up, all patients were asked to fill

questionnaire regarding the treatment and their satisfaction with it. And noticed the USG guided minimally invasive techniques treated patients were shows more satisfaction rate than the incision and drainage techniques. (**Table No. 4**).

## Discussion

Breast abscess is one of the commonest forms of abscess surgical emergencies usually seen in lactating woman.<sup>11</sup> The frequency of occurrence is highly related to pregnancy and mainly caused due to nipple piercing by a child during feeding and bacterial colonization due to improper nursing technique and incomplete emptying of the breast.<sup>12</sup> Immediate diagnosis and treatment is necessary if breast feeding is to be continued and for the prevention of further complications.<sup>13</sup> Treatment of breast abscess traditionally has been incision and drainage however; this has been found to be associated with possible unsatisfactory cosmetic outcome, difficult in breast feeding and needs general anesthesia, prolonged healing time, and regular dressing.<sup>14</sup> Two minimal invasive technique - repeated aspiration with ultrasound guidance and suction drain placement has been found to be another treatment option for breast abscess and this has been reported to be associated with less recurrence, excellent cosmetic result and has less costs.<sup>15,16,17</sup>

The current prospective cohort study, compared two groups, conventional incision and drainage versus ultrasound guided minimally invasive techniques in the management of the breast abscess without control group. In this study, patients' age range has some similarity with the result of Kataria R et al,<sup>18</sup> Karvande R et al,<sup>19</sup> Ulitzsch D et al<sup>20</sup> and Dener et al,<sup>21</sup> who demonstrated that breast abscesses most commonly affects women aged 18-50 years. Although breast abscess generally has been associated with mastitis and breast feeding, the results of present study noted 68.9% women were lactating and rest 31.0% were non-lactating women. Karvande R et al<sup>18</sup> and Kataria R et al<sup>18</sup> reported 90.0% women lactating in their respective study. In present study 56.7% women were primiparae, 31.7% multiparae and 11.7% were nulliparae. In a similar study Karvande R et al reported 61.7% patients were primiparae and 38.3% were multiparae. Kvist LJ et al<sup>22</sup> describes primiparous women to be at a greater risk for the development of breast abscess during lactation than multiparous women.

Inch S. Mastitis<sup>23</sup> literature review describes the breast abscess is commonly located in the upper and outer quadrant, which fits with the point that most of the breast parenchyma is located in this quadrant. This study noted the 71.1% of breast abscess was found in the superior quadrant and 61.1% of breast abscess was located in the right breast. This finding is comparable with Karvande R et al<sup>19</sup>, Eryilmaz et al<sup>24</sup> and Chandika et al<sup>25</sup> reported a similar incidence of breast abscess in the upper and outer quadrant. The present study finding of peripherally located abscess more than centrally locating was consistent with the results of Hamid et al.<sup>26</sup>

In present study USG guided aspiration in 25 (56.6%) patients in group 2; in which 8 (32.0%) of patients require single aspiration and 17 (68.0%) patients require two times needle aspiration for complete resolution. And no need for three times aspiration, as in our study complete resolution was occurred after single/two times aspiration (as we choose the patients in which the greatest dimension of abscess cavity was <5cm).

In this study bleeding and dressing were significantly more time need in conventional incision and drainage group ( $p < 0.05$ ); our study noticed that out of total 90 patients 56 (68.2%) patients were lactating and out of that lactating female having a Staph aureus infection; but it was statistically insignificant distribution in both groups  $p > 0.05$ . Amount of pus was comparatively greater observed in ultrasound guided minimally invasive techniques group but it was also

statistically insignificant ( $p > 0.05$ ). Karvande R et al also reported the mean diameter of the abscess was 5.7 cm in total patients. The mean volume of pus aspirated in aspirated group was 65.65 ml and that in the incised group was 69.47 ml. There was no significant difference in the mean amount of pus aspirated or drained in these two groups. These results were in contrast with the studies of Schwartz et al<sup>27</sup> and Hamid et al.<sup>28</sup>

Our study noticed the requirement of analgesia during the post intervention was significantly more amount and time in conventional incision and drainage group in compare to ultrasound guided minimally invasive techniques group ( $p < 0.001$ ). Fever and return to normal TLC was comparable in both groups ( $p > 0.05$ ). In this study on applying the visual analog scale for measurement of pain intensity; present study noted the significantly greater intensity and duration of pain in conventional incision and drainage group. Kataria R et al reported that in aspiration group is 4.48 and in suction drain is 3.50. Tewari et al reported no pain till 8 day of drain placement.<sup>29</sup> Post operatively clinical symptoms like pain and fever were assessed in the patients of breast abscess treated with aspiration and with incision and drainage. Wound healing was significantly faster in the aspirated group than in the incised group; this finding was similar to the study conducted by Eryilmaz et al.<sup>24</sup>

Our study noted the complete recovery period occurred in minimum three days to maximum forty days. Present study noted the ultrasound guided minimally invasive techniques group patient significantly early recovered than the conventional incision and drainage group ( $p < 0.05$ ). Garg et al<sup>30</sup> reported success rate of 84%. Faisal Elagili et al<sup>31</sup> reported success rate of 83.3% with USG guided aspiration of breast abscess. Alphonse et al<sup>32</sup> observed cure rate of 93.1% in ultrasound guided aspiration. Recurrence and failure procedure was not reported in this study. KandiAJ et al and Markus et al<sup>33</sup> study reported the recurrence rate of USG guided aspiration was 8.57%. Odiya et al<sup>34</sup> has concluded that there was no scarring or distortion of breast parenchyma in breast abscess patients treated with percutaneous suction drain placement. Cosmesis was excellent in 93.3% and good in 6.7% in ultrasound guided minimally invasive techniques group; while in conventional incision and drainage group excellent was 40.0% and good in 60.0%. This study also noted the scar mark was 100.0% patient in conventional incision and drainage group and 100.0% patients were ease to breast feeding in ultrasound guided minimally invasive techniques group. At the end of follow up, all patients were asked to fill questionnaire regarding the treatment and their satisfaction with it. And noticed the USG guided minimally invasive techniques treated patients were shows more satisfaction rate than the incision and drainage techniques. This was agreement to the Karvande R et al,<sup>19</sup> Singh et al<sup>35</sup> and Kastrup et al<sup>36</sup> study.

### **Limitation:**

Our study was single hospital based. Comparatively small sample size due to it was single centered and small study duration. Follow-up time was comparatively small duration. We recommended further multicenter study with large sample size.

### **Conclusion:**

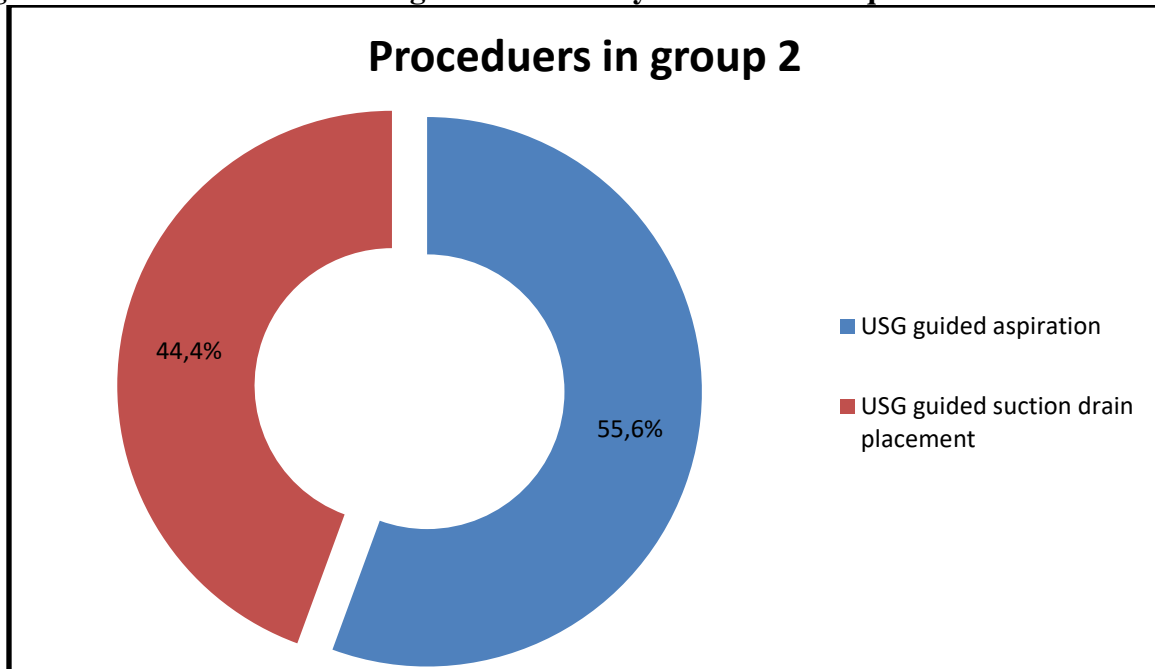
USG guided minimally invasive techniques combined with antibiotics has a great value in the treatment of breast abscess even in abscess with large volume. It does not require any mode of anesthesia and can be done on out-patient department basis. Breast abscess in selected group of patients with diameter of less than 7 cm can be treated by aspiration successfully in lactating women and with a good cosmetic outcome. Aspiration of the breast abscess can be successfully

done as initial mode of management in the treatment, but incision and drainage remains the final resort for cure.

**Table No. 1: Distribution of patients according to demographic and location of abscess**

		Group 1 (n=45)	Group 2 (n=45)	Chi Square value	P value
Age (Years)	≤20	9 (20.0%)	6 (13.3%)	2.415	0.299
	21-40	31 (68.9%)	37 (82.2%)		
	>40	5 (11.1%)	2 (4.4%)		
Parity	Null	7 (15.6%)	4 (8.9%)	1.409	0.494
	One	26 (57.8%)	25 (55.6%)		
	More than one	12 (26.7%)	16 (35.6%)		
Side	Right	30 (66.7%)	25 (55.6%)	1.169	0.279
	Left	15 (33.3%)	20 (44.4%)		
Site	Inferior	9 (20.0%)	11 (24.4%)	4.175	0.124
	Lateral	1 (2.2%)	5 (11.1%)		
	Superior	35 (73.3%)	29 (64.4%)		
Status	Lactating	33 (73.3%)	29 (64.4%)	0.829	0.362
	Non-lactating	12 (26.7%)	16 (35.6%)		
Breast suppression	Positive	11 (33.3%)	6 (20.7%)	1.240	0.265
	Negative	22 (66.7%)	23 (79.3%)		

**Figure No. 1: Procedure in USG guided minimally invasive techniques**





**Table No. 2: Distribution of patients in procedure and no dressing**

		Group 1 (n=45)	Group 2 (n=45)	Chi Square value	P value
<b>Bleeding</b>	<b>None</b>	0 (0.0%)	26 (57.8%)	80.635	<b>&lt;0.001</b>
	<b>Minimal</b>	3 (6.7%)	19 (42.2%)		
	<b>Mild</b>	32 (71.1%)	0 (0.0%)		
	<b>Moderate</b>	11 (24.4%)	0 (0.0%)		
<b>Amount of pus</b>	<b>10-50</b>	32 (71.1%)	24 (53.3%)	8.602	0.072
	<b>51-100</b>	9 (20.0%)	8 (17.8%)		
	<b>101-150</b>	4 (8.9%)	6 (13.3%)		
	<b>151-200</b>	0 (0.0%)	5 (11.1%)		
	<b>&gt;200</b>	0 (0.0%)	2 (6.7%)		
<b>Culture</b>	<b>Staph aureus</b>	33 (73.3%)	23 (51.1%)	4.727	<b>0.030</b>
	<b>Sterile</b>	12 (26.7%)	22 (48.9%)		
<b>Dressing</b>	<b>None</b>	0 (0.0%)	45 (100.0%)	89.000	<b>&lt;0.001</b>
	<b>≤7</b>	4 (8.9%)	0 (0.0%)		
	<b>8-14</b>	36 (80.0%)	0 (0.0%)		
	<b>&gt;14</b>	4 (11.1%)	0 (0.0%)		

**Table No. 3: Statistical analysis of the two study group post-intervention complication**

Complication		Day 3	Day 6	Day 10	Day 13	Day 17	Chi Square value	P value
<b>Fever</b>	<b>Group 1</b>	11	0	0	0	0	5.529	0.237
	<b>Group 2</b>	17	8	2	0	0		
<b>Normal TLC</b>	<b>Group 1</b>	21	36	43	45	45	2.129	0.712
	<b>Group 2</b>	17	28	32	38	45		
<b>Analgesia requirement</b>	<b>Group 1</b>	45	39	24	6	0	16..941	<b>&lt;0.001</b>
	<b>Group 2</b>	45	14	4	1	0		

**Figure No. 2: Pain score (VA Score) at different time interval**

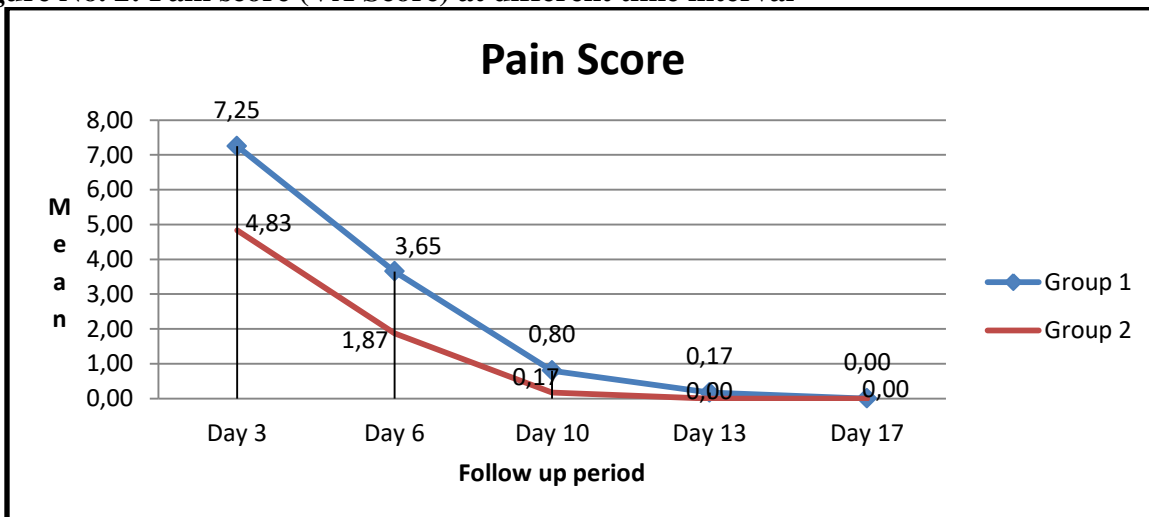


Figure No. 3: distribution of patients on the basis of recovery periods

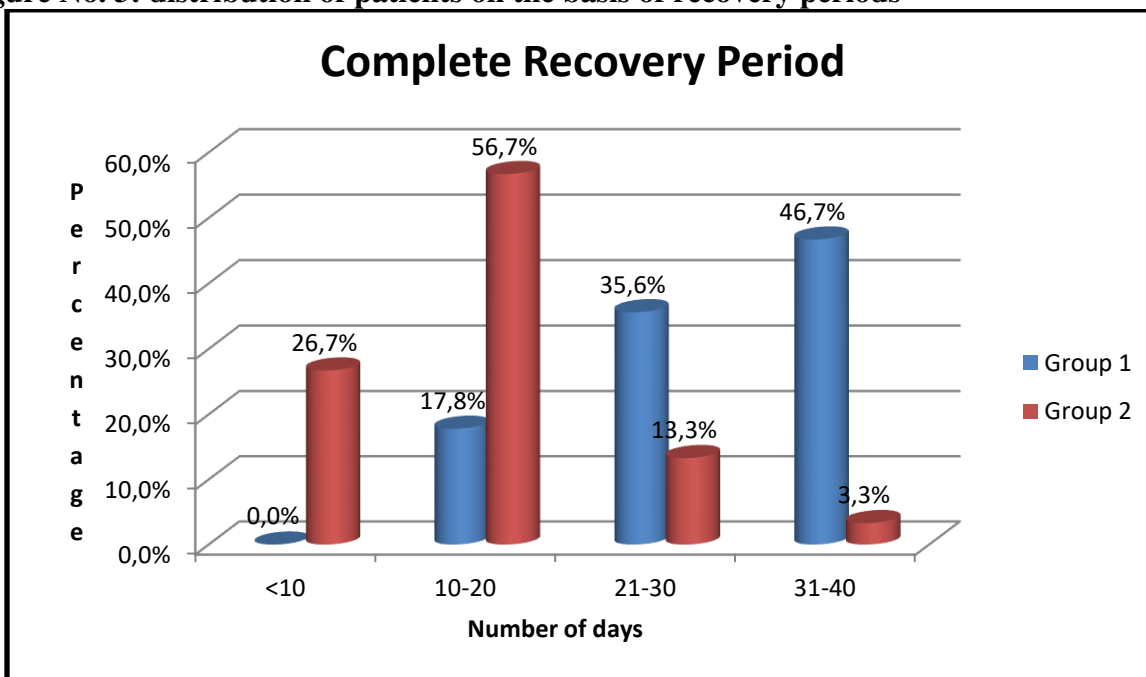


Table No. 4: Distribution of patients' satisfaction

Questions	USG guided minimally invasive techniques	Incision and drainage techniques
Can do the things I thought I will be able to do after surgery	45/45	34/45
I was helped as much as I thought I would be after surgery	45/45	37/45
My problems were reduced as much as I expected them to after surgery	31/45	28/45
The benefits of any care outweigh the setbacks it caused me	35/45	29/45
Overall, I am happy with the care I am receiving for my disease	38/45	35/45
All things considered, I would have the surgery again for the same reason	45/45	37/45

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