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A Comparative Study of the Efficacy of Human Placental Extract with Collagen Sheets in 20-40% Partial Thickness Burns

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Abstract
Burns is a major health problem all over the world. Placental extract dressing and collagen sheet dressing are two modalities of treatment in burns management. In a prospective study comprising of 100 patients in a tertiary care hospital, we compared the efficacy of placental extract dressings with collagen sheet dressing. The baseline characteristics like age, sex burns percentage etc. were comparable in both groups with 50 patients each The outcomes were significantly better in the placental extract group with lesser infections, better scars, lesser hospital stay and overall better treatment outcomes.

Key Words: *Placental extract, Collagen sheet, Partial thickness burns, Infection, Scar.*

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I. Introduction

Burn injuries pose a major health problem world-wide and is more so in developing countries like India. There are about seven to eight lakh hospital admissions per year with burns in India compared to around forty thousand in USA and around thirteen thousand in UK. More than 1.2 lakh deaths occur due to burns every year in India[1]. The major improvements in the management of burns other than better antibiotics, included the use of placental extract gel which is said to improve healing and decrease morbidity[2]. The other modality of treatment, namely collagen sheets are also useful in improving outcomes in burns[3]. We compared the effectiveness of both modalities face to face in a prospective study.

AIM OF THE STUDY

To compare the efficacy of human placental extract over collagen sheets in fresh 20-40% partial thickness burns. To assess the morbidity benefits and positive effects on hospital stay and outcome benefits.

II. Materials And Methods

A total of one hundred cases of partial thickness burns with less than 40% of body surface area involvement, admitted to Coimbatore Medical College Hospital between January 2018 and December 2018 were included in the prospective study. They were equally distributed into two groups 50 patients each, with first group receiving placental extract gel dressings and the second group receiving collagen sheet dressing.

After thorough cleansing with povidone iodine or any other antiseptic solution, patients received placental gel or collagen sheet application as per randomisation. Patients were followed with close monitoring and evaluation till discharge. The results were analysed and statistical significance assessed using chi-square test.

INCLUSION CRITERIA

1. Partial thickness burns.
2. Fresh burns presenting within 24 hours
3. Age less than 50 years.
4. Non-infected burns.
5. Less than 40% surface area of body involvement.

EXCLUSION CRITERIA

1. Full thickness burns.
2. Late presentation (more than 24 hours)

3. Age more than 50 years.
4. More than 40% of body surface area involvement.
5. Infected burns.
6. Patient received treatment elsewhere.
7. Patients with systemic illness.
8. Not willing to consent for the study.

III. Results

Mean age of patients in both groups were 35.26+/_ 9.927 in placental extract group and 38.06+/_10.504 in the collagen sheet group with no statistically significant difference.

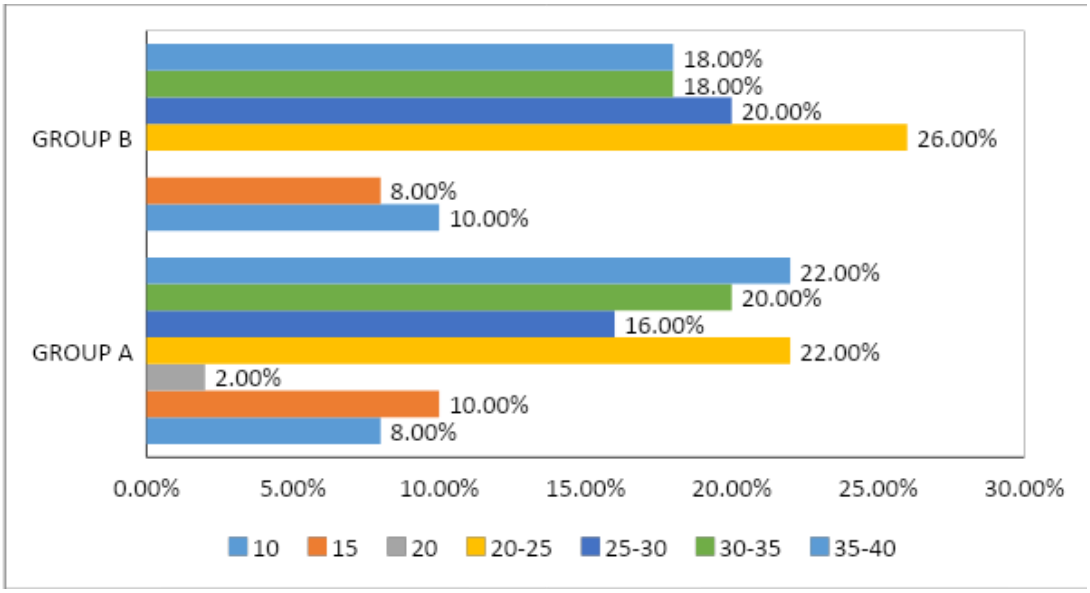
AGE	GROUP A (PLACENTA EXTRACT)		GROUP B (COLLAGEN SHEET)	
	Mean	Standard Deviation	Mean	Standard Deviation
	35.26	9.927	38.06	10.504

Sex distribution was even in both the groups with 26 males and 24 females in the placental extract group and 24 males and 26 females in the collagen sheet group.

GENDER	GROUP A		GROUP B	
	NO	%	NO	%
MALE	26	52.0%	24	48.0%
FEMALE	24	48.0%	26	52.0%
Total	50	100.0%	50	100.0%

Distribution of patients in the various burns percentage spectrums also showed a uniform distribution in both the groups. Chi square test showed a p value 0.932 (statistically insignificant).

PERCENTAGE OF BURNS	GROUP A		GROUP B	
	NO	%	NO	%
10	4	8.0%	5	10.0%
15	5	10.0%	4	8.0%
20	1	2.0%	0	.0%
20-25	11	22.0%	13	26.0%
25-30	8	16.0%	10	20.0%
30-35	10	20.0%	9	18.0%
35-40	11	22.0%	9	18.0%
Total	50	100.0%	50	100.0%

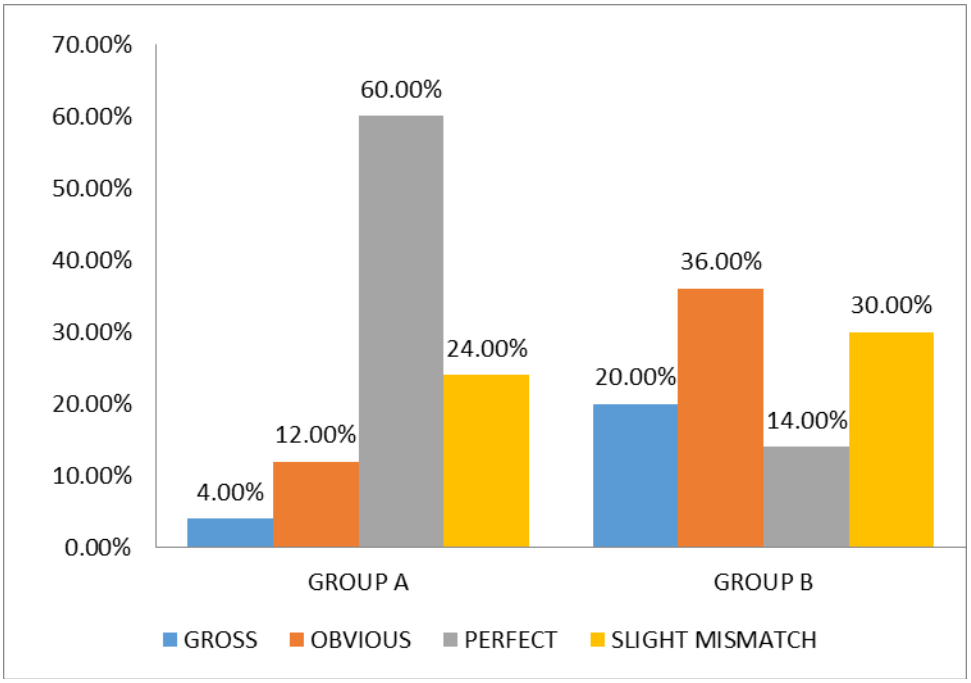


Patients were equally distributed in both groups as far as degree of burns is concerned.

DEGREE OF BURNS	GROUP A		GROUP B	
	NO	%	NO	%
FIRST	26	52.0%	25	50.0%
SECOND	24	48.0%	25	50.0%
Total	50	100.0%	50	100.0%

Comparison of scar colour showed that only 4% of patients in the placental extract group had obvious mismatch, while 60% had perfect scar colour. In the collagen sheet group, 20% had obvious mismatch and only 14% had perfect scar colour. (p=0.001)

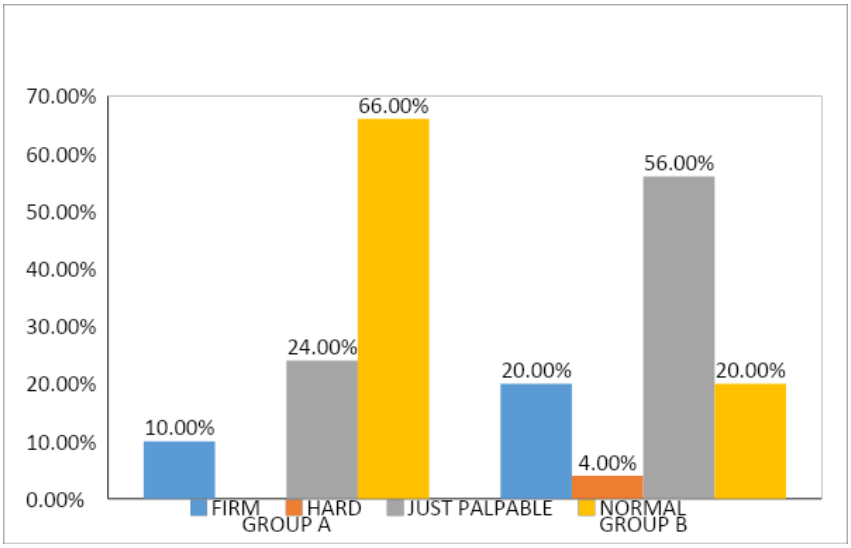
SCAR COLOUR	GROUP A		GROUP B	
	NO	%	NO	%
GROSS	2	4.0%	10	20.0%
OBVIOUS	6	12.0%	18	36.0%
PERFECT	30	60.0%	7	14.0%
SLIGHT MISMATCH	12	24.0%	15	30.0%
Total	50	100.0%	50	100.0%



Comparing scar texture, 66% of individuals in placental extract group had normal scar texture while only 20% in collagen sheet group had normal scar texture. (p=0.001)

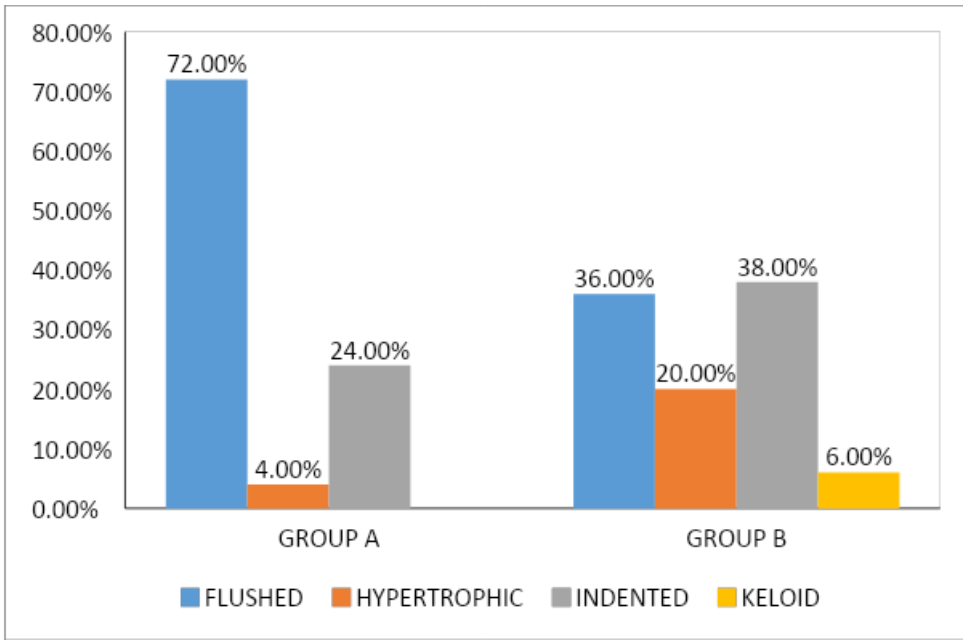
SCAR TEXTURE	GROUP A		GROUP B	
	NO	%	NO	%
FIRM	5	10.0%	10	20.0%
HARD	0	.0%	2	4.0%
JUST PALPABLE	12	24.0%	28	56.0%

NORMAL	33	66.0%	10	20.0%
TOTAL	50	100.0%	50	100.0%



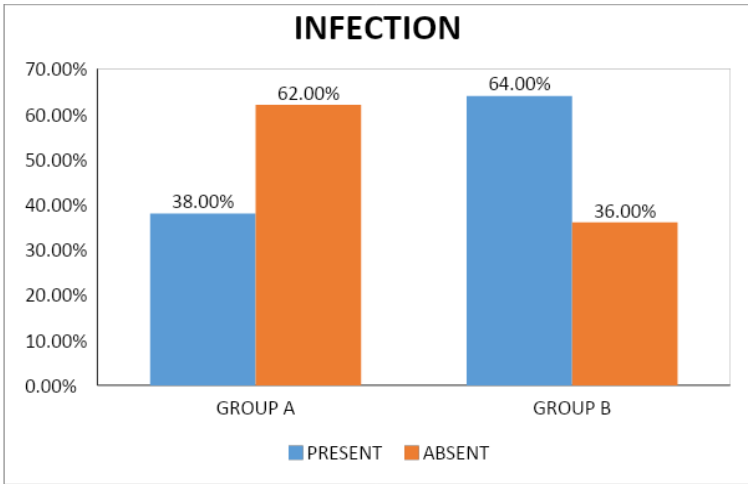
Scar was flushed with skin in 72% in placental extract group and none of them had keloid formation. In collagen sheet group 18% had scar flushed with skin and 6% had keloid. (p=0.001)

SCAR CONTOUR	GROUP A		GROUP B	
	NO	%	NO	%
FLUSHED	36	72.0%	18	36.0%
HYPERTROPHIC	2	4.0%	10	20.0%
INDENTED	12	24.0%	19	38.0%
KELOID	0	.0%	3	6.0%
Total	50	100.0%	50	100.0%



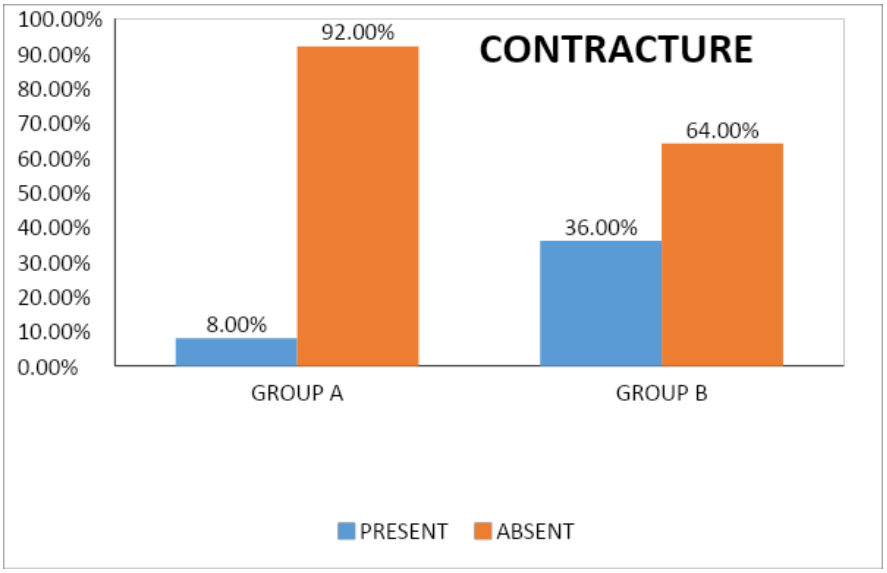
38% of patients in the placental extract group had infection, while 64% in the collagen sheet group had infection. (p=0.009)

INFECTION	PLACENTA EXTRACTGROUP		COLLAGEN GROUP	
	NO	%	NO	%
PRESENT	19	38.0%	32	64.0%
ABSENT	31	62.0%	18	36.0%
TOTAL	50	100.0%	50	100.0%



Contracture was present in 8% of placenta extract treated patients, compared to 18% in the collagen sheet group. (p=0.001)

CONTRACTURE	GROUP A		GROUP B	
	NO	%	NO	%
PRESENT	4	8.0%	18	36.0%
ABSENT	46	92.0%	32	64.0%
TOTAL	50	100.0%	50	100.0%



Both groups required other modalities of treatment like fasciotomy, wound debridement etc without any significant statistical difference. (p=0.519)

OTHER MODALITIES	GROUP A		GROUP B	
	NO	%	NO	%
NONE	36	72.0%	28	56.0%
WOUND DEBRIDEMENT	6	12.0%	8	16.0%
TANGENTIAL EXCISION	1	2.0%	2	4.0%
SPLIT SKIN GRAFT	5	10.0%	7	14.0%
FASCIOTOMY	2	4.0%	5	10.0%
Total	50	100.0%	50	100.0%

Hospital stay was shorter in the placental extract group (14 days) compared to collagen sheet group (18 days). Wound healing was faster in the placental extract group in follow up.

VARIABLES	GROUP A		GROUP B		UNPAIRED T TEST P VALUE
	Mean	Standard Deviation	Mean	Standard Deviation	
DURATION OF STAY	14.46	4.59	18.78	4.36	<0.001
DURATION OF WOUND HEALING	19.86	4.04	24.18	4.00	<0.001

IV. Discussion

Burn injuries produce coagulative necrosis of the skin and underlying tissues which is very painful and is associated with complex local and systemic complications and a high mortality. Superficial burns i.e. First degree burns heal in 5-7 day time without any scarring. While superficial dermal or deep dermal burns i.e. 2nd degree burns take anytime between 2 to 4 weeks to heal and are extremely painful. Second degrees burns if not treated promptly and properly, may get infected & get converted into third degree i.e. Deep burns resulting in scarring & contracture formation4.

In spite of various advances in the treatment of burns and better understanding of pathophysiology and advent of various spectrum of antibiotics to prevent infection in burns, the 2nd to 3rd degree burns are still an enigma and challenge to the surgeons[5].

The morbidity and mortality in burns are still high. To decrease morbidity and mortality tangential / primary excision and grafting has become imperative in second and third degree burns. But the effort to prevent the progression of depth of burns, the relief of pain, the requirement of high quantities of intravenous fluid for resuscitation and use of appropriate antibiotics are still a daunting task for the surgeons.

Going through the literature, there were studies comparing various treatment modalities of treatments in burns available in literature.

A study by MukundB Tayade et al at JJ Hospitals Mumbai compared collagen sheet dressing to silver sulfadiazine dressing in partial thickness burns, showed significant lowering of hospital stay in the collagen sheet group. There was lesser infections and better healing and scar formation in collagen sheet group[6].

M P Pote et al conducted a study in S R T R government medical college Ambajogi comparing povidone iodine, silver sulfadiazine and placental extract. There was significantly better outcomes in the placental extract group for infections, wound healing and hospital stay[7].

A study by Onkar Singh et al comparing use of collagen dressings to conventional dressing in burns and other chronic wounds showed no significant difference in terms of completeness of healing of burns and chronic wounds with collagen dressings. 60% of collagen sheet group wounds were sterile compared to 42% in conventional group[8].

A study by Sanjay Changole et al at Government Medical College and Hospital, Nagpur compared collagen sheet and placental extract in partial thickness burns. Healing time was partially better in collagen sheet group. Mean hospital stay also was significantly better in collagen sheet group compared to the placental extract group. Infection rate was equal in both the groups. Scar quality and texture was comparable in both the groups. The cost of treatment was almost ten times high in the collagen sheet group[9].

Our study showed a bit different results favouring placental extract over collagen sheet. It was observed that placental gel dressing caused significant amount of rapid re-epithelisation of burns wound i.e. less

duration of wound healing than collagen dressing group. From the Statistical analysis it is concluded that median time taken for wound healing was 19 days in placental gel group over 24 days in the collagen dressing group. The mean hospital stay was 14 days in placental gel group when compared to 19 days in collagen gel group.

V. Coclusions

Placental extract is safe and effective for treating burns patients over collagen sheets.

➢ Placental gel has been very well tolerated in burn patients

➢ Placental gel dressing improves the healing process of Burn wound when compared to collagen dressings.

➢It minimises the duration of follow up and the usage of antibiotics

➢ Very much useful in second degree burns.

➢It is cost effective when compared to collagen sheets.

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