Cranioplasty the use synthetic (Acrylic) or Autograft

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Summary:

Background: Patients who undergo craniectomy or removal of part of the skull bone following trauma to give a release to the brain are later managed by auto graft, or synthetic acrylic graft.

Patients and method: 20 patients transferred to specialized surgical hospital from U.S mellitary Ibn Sinna hospital with removal the skull bone implanted in the abdomenol wall or thigh and managed by returning of the bone to the scalp compared with 20 patients managed in our hospital to start by craniectomy and implantation of a synthetic bone graft acrylic, the comparism included the surgery, time of delay, out come, complication.

Results: We divided the patients to group A and B, A were the ones treated by Autograft & B by synthetic graft (Acrylic). In both groups half of the patients were between 20 and 40 years of age, with male predominance, the delay of surgery were more group B, but the complications were more in group A, & 25% required surgical intervention & removal of the graft.

Conclusion: we think that Acrylic cranioplasty is better than Auto graft cranioplasty in traumatic cases as it carries better cosmetic results & final out come.

Keywords (Acrylic) bone graft, Autogenic, synthetic bone, head injury.

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Introduction:

Cranioplasty is the procedure of replacing a skull bone defect with patient own bones or synthetic material. (1)

Indication: the presence of skull defect due to contaminated depreressed skull fractures, or non contaminated managed by craniectomy (2), radionecrosis & electronic burns of the skull. And congenltal absence of part of the skull. (2, 3, 4)

The aim of the surgery is protection of the brain & cosmetic appearance. (17)

The contraindication for such surgery are the presence of hydrocephalus, cerebral swelling, infection, compound wound involving para-nasal sinues, & children below 4 years with possibility of auto – growth of bone.(8)

The timing of cranioplasty is critical for the development of infection in devitalized autografts or around acrylic substance it's generally accepted that cranioplasty should be delayed 3-6 months after compound wounds & at least 1 year after wound infection, and the time is usually 3 months with autograft (implanted type) (3,4,7,8)

Surgical procedure: in autograft (the type in our study), the skull bone is placed in abdominal wall & thigh, & then in about 3 months time it's returned in place & put in place by suturing or wiring.

Acrylic type the defect is identify & using the acrylic, in the area & the closure is done.(5)The complications are subdural or intracerebral haematoma, or dural tears by the wires.The most important post- operative complication is infection which require removal or only conservative treatment other less important complications includes granuloma, or sinus, or skin erosion. (6, 7)

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Patients & Method:

20 patients received from Ibn Sinna (U.S Mellutary) hospital) managed by bone skull removal to compensate the ↑ ICP & implantation of the bone in the abdominal wall or theigh, & managed in special surgical hospital by return of the bone to it's place (autogenic bone) these patients were received from January 2005 till March 2007.

These patients were compared with 20 patients managed in the same hospital (specialization surgical hospital) in the same time primarily by craniectomy for depressed fracture of the skull & then using synthetic bone.

The 1st 20 patients will be Labelled as group A, & the 2nd 20 patients are labeled as group B.

Table (1): Type of injury:

Type	Group A (autograft)		Group B (acrylic)	
Shell injury	9	45%	6	3%
Bullet injury	8	40%	4	20%
Car accident	2	10%	3	15%
Quarrel			4	20%
Fall from heigh	1	5%	3	15%

Table (2): Site of implantation in group A:

Site	No.%	%
Abdomenal wall	15	75%
RT. Thigh	3	15%
Both thighs	2	10%

Table 3: Time between the first surgery & the implantation:

	Group A		Group B	
1-3m	1	5%	-	-
3-4m	17	85%	-	-
4m-6m	1	5%	-	-
6m-7m	1	5%	18	90%
6m > 7m	-	-	2	10%

Table (4): Time of surgical procedure:

	Type A		Type B	
Less than 1 hour	1	5%	-	-
1 – 2 hour	12	60%	9	45%
2-3 hour	6	30%	11	55%
More than 3 hour	1	5%	-	

Table (5): Time of hospitalization following surgery:

	Type A		Type B	
2 days	12	60%	14	70%
3 days	7	35%	6	30%
4 days	1	5%	-	

Table (6): outcome & complications:

Complication	Type A		Type B	
Infection requiring treatment only	2	10%	1	5%
Infection requiring removal	1	5%	2	10%
Cosmetic problem not requiring other surgery	4	20%	-	-
Cosmetic problem requiring other surgery	4	20%	-	-
Problem with the implantation site	2	10%	-	-

Results:

In both group A & B there is a male predominance the more liable sex for trauma especially in group A, where military show 70% of the study. The age of the patients in both groups around half of the patients were in the age 20-40 years.Regarding the time of delag In group A 90% was in the 1st 4 months while in type B 90% needed 6-7 months delay i.e. type A is beter regarding this point.Both group were so close regarding the time of surgical procedure & time of hospitalization following surgery. The most important point is the post-operative complications. Infection requiring conservative measures only was in type A 10%, type B 5% while infection-requiring removal was 5% & 10% respectively

Discussion:

Post Operative infection requiring conservative treatment was 10% in type A & 5% in type B , While infection requiring removal was 5% in type A & 10% in type B & there results are acceptable as compared with other studies as Grant & Nocross show infection rate of 8% (9) while Hammon & kempe reported 12% rate of infection requiring removal of bone graft (10) Cosmotic results only 60% of group A were good, & 20% requiring another surgery, we think that this is because the bone after implantation is partially resorbed in the implanted area & 20% required another surgery , if we add the failure due to infection it show that it show that 25% of patients with auto graft will need another surgery which is a high percentage.10% of group A, show problems in the implanted area including abdominal wall sepsis, & bone exposure that required early cranioplasty to avoid bone infection.

Conclusion:

We think that Acrylic cranioplasty is better than Auto graft cranioplasty in traumatic cases as it carries better cosmetic results & final out come.

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