DISCUSSION

Vicryl was used as subcuticular suture in this study. Vicryl is durable as well as absorbable and tissue reaction is minimal. An effective decrease in the duration of hospital stay required after operation was a uniform feature for all cases.

Laparotomies required the longest stay in hospital after operation but this is a reflection of the nature of operation rather than the method of wound closure.

Since skin sutures do not need to be removed, the patient may be discharged as soon as he has fully recuperated from the operation itself. He does not require to attend the OPD for removal of stitches as in conventional methods of skin suture. Thus the number of man-days lost while he is away from work is considerably reduced, in some cases by as much as 50%. This also means a reduction in expense of money and time on the part of hospital personnel.

The infection was essentially mild and manifested by erythema of the wound edges. In none of the cases was frank pus a feature. The infection readily subsided on changing the antibiotic to a broader spectrum
one and in no way had a lasting effect on the outcome of the procedure as far as cosmesis is concerned.

Wound gaping was seen in 2 of the 60 cases. Only a slight degree of gaping of one end of the incision line was seen in either case and was presumably a result of too much tension on the suture length.

Keloid formation occurred in a single case along the incision line. This is not a true complication of associated with the use of vicryl for subcuticular sutures as keloid would have occurred in any case. The fact that subcuticular sutures avoid piercing the skin did in fact, reduce the aberration that would have occurred had traditional method of skin closure been used.

Scarf tenderness is not attributable to the particular method of closure of skin since this is a common complaint in any case. It is considered, however, that the presence of foreign material (vicryl) in the skin may have contributed to the tenderness by eliciting a degree of subacute low grade inflammation. The fact that the degree of tenderness was never more than mild and an inconvenience rather than incapacitation coupled with the feeling that this percentage is no more than that seen in other methods precludes the abandoning of the method on this count alone.
The site of operation was not a determinant of the final outcome i.e. neither the incidence nor the severity of complications depended on the type of operation. The cosmesis was equally well achieved in all regions.

In each case, the final result aimed at was the achievement of a hair line scar that was poorly visible. This was possible in all but 3 cases, two with dehiscence and one with keloid.

The former two resulted in an acceptable deviation from the ideal. Predictably, patients in the higher age groups had cosmetically better results since their finally wrinkled skin concealed the scar effectively.

This study confirms the suitability of vicryl for subcuticular sutures. The requirement for wound support varies in different tissues from a few days for muscle, subcutaneous tissue and skin to weeks or months for fascia and tendon to long term stability as for a vascular prosthesis. The surgeon must be aware of these differences in the healing rates of various tissues & organs. In addition, factors present in the individual patient, such as infection, debility, respiratory problems, obesity etc, can influence the post operative course and rate of healing.
Suture selection should be based on a knowledge of the physical and biologic characteristics of the material in relation to the healing process. The surgeon wants to insure that a suture will retain its strength until the tissue regains enough strength to keep the wound edges together on its own. In some tissue that might never regain preoperative strength, the surgeon will want suture material that retains strength for a long time. If a suture is going to be placed in tissue that heals rapidly the surgeon may prefer to select a suture that will lose its tensile strength at about the same rate as the tissue gained strength and that will be absorbed by the tissue so that no foreign material remains in the wound once the tissue has healed. With all sutures, acceptable surgical practice must be followed with respect to drainage and closure of infected wounds. The amount of tissue reaction caused by the suture may encourage or retard the healing process.

When all these factors are taken into account the surgeon has several choices of suture materials available. Selection can then be made on the basis of familiarity with the material, its ease of handling and other subjective preferences.
Tissue reaction and a cellular response occurs whenever foreign material is implanted in tissues. When the smallest appropriate sized suture is used, there is less tissue trauma from the suture itself & its passage through tissue. Fine size, closely placed suture, decreases the possibility of dead space within the wound.

Two important characteristics describe the 'in vivo' performance of absorbable sutures: first, tensile strength retention, and second, the absorption rate.

Specific patient conditions, such as increased body temperature, presence of infection, protein deficiency etc, are not controllable by the suture manufacturers. These conditions may enhance a rapid decline in tensile strength and produce a more rapid absorption of suture. In any case absorbable sutures should not be used where extended approximation of tissues under stress is required.

It is important to realize that the rate of tensile strength loss and the rate of suture absorption are separate events. For example, a suture can lose tensile strength rapidly in tissue and yet absorb slowly. Or it may retain very adequate tensile strength through the vital time of wound healing and then absorb rapidly.
The absorption process is manifested by a gradual, almost linear loss of tensile strength over the first several weeks post implantation. This is followed, often with considerable overlap by the second stage of absorption, which is loss of suture mass. During these periods, leucocytic cellular responses occur that serve to remove cellular debris as well as suture material from the line of tissue approximation.

It is usual to close the skin with interrupted sutures, either simple or mattress. The subcuticular suture technique was devised primarily for caesarean. It has proved useful especially in females where a hairline scar is desirable. This is because the traditional method of skin suturing leaves rather large suture marks which are all the more prominent if the stitches are left in place for a period longer than the optimal. Since skin is not pierced, in subcuticular sutures, marks consequent upon customary method of wound closure are not produced and the patient is left with merely the incision scar which is inevitable. The silk or cotton sutures have to be removed after 3-10 days but subcuticular sutures with vicryl do not need to be removed and hence the patient may be discharged from the hospital early.

Wound healing of closed clean incisions

Immediately upon infiltration of an incision, highly complex changes occur both locally
and systemically. Many of these may not be immediately apparent but their presence may be guessed and logically worked out. Several of them may appear to be occurring sequentially when, in fact, they are taking place simultaneously, triggered by the insult to the body.

The morphologic events may be briefly summarized as follows:

As soon as injury is inflicted, small vessels go into a brief phase of vasoconstriction, presumably as an immediate measure to effect hemostasis. This is followed by prolonged dilatation. During this later phase, the wall of the vessels becomes abnormally permeable to proteins and plasma leaks into the site of injury. Leucocytes stick to the endothelium and actively move through the vessels wall.

In several hours, the injury site is filled with protein-rich inflammatory exudate rich in WBC, RBC and fibrin strands. This acute response subsides in a few days.

Polymerophuclear leucocytes phagocytize cellular debris and injured tissue fragments and these cells predominate in the early phase of acute inflammation due to injury. Later, monocytes become the major cells and continue the scavenging activity for weeks. Monocytes are also necessary for normal fibroblast
production and invasion of wound space.

Histamine, 5-Hydroxytryptamine and prostaglandins are the various chemical mediators of inflammation.

The epidermis in immediate proximity to the wound edge begins to thicken within 24 hours of injury and the process of epithelialization commences. At first the marginal basal cells enlarge, lose their adhesions to the fibro underlyling dermis and migrate down across the defect. Rapid mitotic divisions occur in marginal basal cells, the daughter cells migrating by contact guidance along fibrin strands and by contact inhibition. Within 48 hours, the entire gap is bridged. These cells then flatten, further divide, and keratinize.

Around the second or third day, fibroblasts appear in the wound. There are spindle shaped cells derived from local mesenchymal cells. They migrate, using fibrin strands as scaffolding, by forming adhesive contacts with the substratum. They need a solid or semi-solid substrate for their movement. Large quantities of fibrin, blood clot or dead tissue may form a physical barrier preventing fibroblast movement and delayed collagen production. Rapid capillary proliferation is a prominent feature and is brought about by budding of existing vessels.
At the same time that fibroblast population decreases markedly by the fifth week, the presence of collagen fibres becomes a dominant part of the microscopic picture of the healing wounds. The space at first is filled up with randomly placed fibres. These gradually orient themselves into massive, dense collagen sutures. Collagen is in a constant state of formation and disintegration. An imbalance in this equilibrium may jeopardise the structural integrity of scar as a whole.

It has been realised of late that wounds continue to gain in strength even after many years and no plateau is really reached.