

Special article

Investigation of the best suture pattern to close a stuffed Christmas turkey

D. Verwilghen, V. Busoni, G. van Galen, M. Wilke

Instructions on how to debone and stuff a turkey are available, but what is the best way to close it up? A randomised trial involving 15 turkeys was performed in order to evaluate skin disruption scores and cosmetic outcomes following the use of different suture patterns. Turkeys were deboned, stuffed and cooked according to guidelines of the US Department of Agriculture Food Safety and Inspection Services. After stuffing, they were randomly assigned to one of five closure groups: simple continuous Lembert; simple continuous Cushing; simple continuous Utrecht; simple continuous; or staples. Turkeys were cooked at 180°C for two hours ensuring core temperature reached 75°C. Suture line integrity was evaluated after removal of the sutures and the cosmetic aspect was graded. Before cooking, the Utrecht pattern and skin staples offered the best cosmetic result. After removal of the sutures, the skin remained intact only in the stapled group. All other suture patterns disrupted the skin after removal of the sutures, rendering the turkey less cosmetically appealing for serving. Closure of a stuffed turkey was best performed using skin staples to achieve the best cosmetic results. Using this technique you will be able to impress family and friends at a Christmas dinner, and finally show them your surgical skills.

ALTHOUGH the first known Christmas day celebration was observed towards the end of the fourth century of the Common Era as a Christian feast (Conybeare 1899) it took another 600 years for it to become widespread on the European continent. In their turn, the Europeans took the English way of celebrating Christmas to the USA when they settled on the American Atlantic seacoast. After a period of disfavour, when it was banned in Calvinistic New England between 1659 and 1681, several forms of celebration arose. The current form was first described around the end of the 19th century (Restad 1996), particularly during what is now called the Victorian era. The Christmas occasion has become commercialised over the decades and several old and new traditions have been added. Some of the more vivid images attached to it are those connected with a warm family reunion – with plenty of eating and drinking! In many European countries and the USA, a stuffed turkey is traditionally served during the Christmas or Thanksgiving meal.

The modern turkey originates from one of the subspecies of wild turkey (*Meleagris gallopavo*) (Dickson 1992), which was brought to Europe by the Spanish on their return from the American continent in the 15th century. From that time, the turkey became popularised but remained far too expensive for common people and was only served

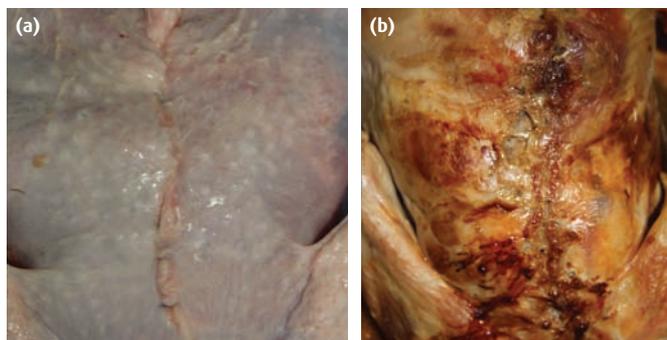


FIG 1: Stuffed turkey closed with Utrecht pattern (a) before and (b) after cooking

in feast meals in high society. It was in the late 1800s that it gradually replaced roast beef or goose at Christmas or Thanksgiving.

Deboning and stuffing a turkey is regarded as an art in cooking sciences; little meat should be lost and the stuffing should be firmly packed into the emptied abdomen. In order to prepare the safest and best stuffed turkey, the Food Safety and Inspection Services of the US Department of Agriculture (USDA) has published some guidance (USDA 2007). This document clearly explains stuffing preparation, cooking times and hygienic conditions to be followed during preparation. But how should a stuffed turkey be closed?

The aims of this study were to describe the different suture patterns used for the closure of a stuffed Christmas turkey and to compare their resistance to bursting of the skin and cosmetic outcomes after cooking.

Materials and methods

Fifteen bio-label Turkeys with a mean weight of 3.56 kg were prepared according to the guidelines of the Food Safety and Inspection Services of the USDA (USDA 2007). They were deboned as instructed in Darina Allen's Ballymaloe cookery course notes (Allen 2001). Briefly,

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D. Verwilghen, DVM, MSc, PhD, DES, DiplECVS,

G. van Galen, DVM, MSc, DES, DiplECEIM,

Large Animal University Hospital, Swedish Faculty of Agriculture, Uppsala, Sweden

V. Busoni, DVM, PhD, DiplECVDI, Equine Clinic, Department of Clinical Sciences of Companion Animals and

Equids, Faculty of Veterinary Medicine, University of Liege, Belgium

M. Wilke, DVM, DiplACVS/ECVS, Wittlingen, Germany

E-mail for correspondence: denis@proamhorses.eu

TABLE 1: Mean skin disruption scores[†] and cosmetic grades[‡] for stuffed turkeys

Closure pattern (n=3 per group)	Before cooking		After cooking/before suture removal		After suture removal	
	Skin disruption	Cosmetic grade	Skin disruption	Cosmetic grade	Skin disruption	Cosmetic grade
Lembert pattern	0	3.6*	0	3	2.3	2.3
Cushing pattern	0	4	0	3.6	2.6	2.3
Utrecht pattern	0	4.6	0	4.6	2.3	2.3
Simple continuous	1.3*	2*	2.3*	2	2.6	1.3
Skin staples	0	5*	0	4.6	0.3	4.6*

* Significantly different, P<0.01

[†] Scale 0 to 3, ranging from no to extensive disruption, [‡] Scale 1 to 5, ranging from bad to excellent

Discussion

The Lembert pattern is commonly known to result in more suture material exposure when performing intestinal anastomosis (Nieto and others 2006), which was confirmed in the present study. It therefore performed poorly in cosmetic grading both before and after cooking. Nevertheless, in intestinal anastomosis, this pattern may be preferred as it causes less purse string formation than the Cushing pattern, a matter that is obviously not important when suturing

the skin was slit with a dorsal midline incision from neck to tail using a small sharp knife. The flesh and skin was then evenly cut from the carcass on both sides, with blunt finger dissection on uneven surfaces ensuring little loss of meat. Particular care was taken not to sever the skin when reaching the ridge of the breastbone where skin and bones meet. The cavity was cleaned and filled evenly with stuffing until a tensionless apposition could still be obtained. The incision (skin and muscle tissue) was closed with one of the following suture patterns: simple continuous Lembert; simple continuous Cushing; simple continuous Utrecht; simple continuous; or skin staples. All sutures were made with number 2 polyglactin 910 (Vicryl; Ethicon) using a round needle. The turkeys were cooked at 180°C for approximately two hours ensuring the core temperature of the stuffing reached 75°C. Disruption of the skin (scored on a scale from 0 to 3, ranging from no to extensive disruption) and cosmetic aspect (scored on a scale from 1 to 5, ranging from bad to excellent) was visually evaluated before and after cooking, and before and after removal of the sutures, by a panel of three cooking experts. Hygienic conditions were maintained during the whole procedure. All cooked turkeys were offered to charity on completion.

Mean skin disruption scores and cosmetic grades were compared using analysis of variance. Significance was set at P<0.01.

Results

All turkeys were deboned without disrupting the skin or creating holes in the meat. Mean skin disruption scores and cosmetic grades are shown in Table 1.

For both skin disruption and cosmetic results before cooking, only the simple continuous pattern showed significantly different results from other methods, with stuffing and meat protruding through the suture line. The Lembert and simple continuous patterns resulted in more exposed suture material, which decreased cosmetic scores. Results from use of the Lembert method were significantly different from that of staples, with staples having the highest score for cosmetic results before cooking. After cooking, no differences were shown in suture pattern, except that the continuous pattern had significantly lower skin disruption scores. The Utrecht pattern and skin staples had significantly better cosmetic scores, but did not differ from each other. Following removal of the sutures after cooking, the skin staples had significantly better skin disruption and cosmetic scores.

stuffed turkeys. However, this may have been one reason why the Cushing pattern showed more skin disruption after removal of the suture, as more skin may have been inverted into the closure with this pattern. Also, more skin may be pulled out in patterns that have a perpendicular rather than a parallel orientation to the incision line when the suture is removed from the sealed skin.

The Utrecht pattern is probably the most popular method used for closing the uterus after caesarian section in cattle. This pattern may be seen as intermediate between the Cushing and Lembert, as every suture bite is taken obliquely to the cut edge (Roberson 2004). This pattern creates good inversion with minimal exposure of the suture material, explaining the good cosmetic results obtained before cooking in this study (Fig 1). Nevertheless, extensive disruption of the skin occurred after removal of the sutures. Overall, the skin staples performed best (Fig 2). Skin staples are known to provide good apposition with a rapid and precise closure of the skin. In a study comparing end-to-end jejunojejunal anastomosis with two-layer hand-sewn inverting pattern to a one-layer skin staple closure (Gandini and Bertuglia 2006), skin staple application was fast, safe and mechanically comparable to the suturing technique. Nevertheless, the bursting pressure of the stapled anastomosis was significantly less than that of the sutured samples. This was not found to be the case in the present study in which skin disruption was observed to be minimal. However, it should be pointed out that stuffing was performed in order to obtain tensionless apposition of the skin edges. If more stuffing had been inserted, skin disruption may have been more pronounced in this group and closure may not have been possible at all, as stapling of skin demands minimal tension on edges to be apposed. After removal of the staples, this group also performed best on both cosmetic and skin disruption scores. Unless sutures are removed meticulously, extensive disruption of the skin will always occur. Portions of skin and cooked meat attached to the suture material, which in turn disrupted the skin during removal, resulting in a poorer cosmetic effect than after removal of skin staples. Using a monofilament suture may avoid this complication, as this type of material is known to cause less drag effect in tissues than polyfilament sutures. A potential drawback for the use of skin staples may be their indigestibility if one is forgotten in a served piece of turkey. Resorbable sutures, such as polyglactin 910, do not pose this problem as they will be digested along with the meat.

In conclusion, the use of skin staples in closing stuffed Christmas turkeys was shown to provide rapid closure with the best cosmetic results. Using this technique, you will finally be able to impress family and friends with your surgical skills at a Christmas or Thanksgiving dinner, even if you are called away for an emergency – as always!

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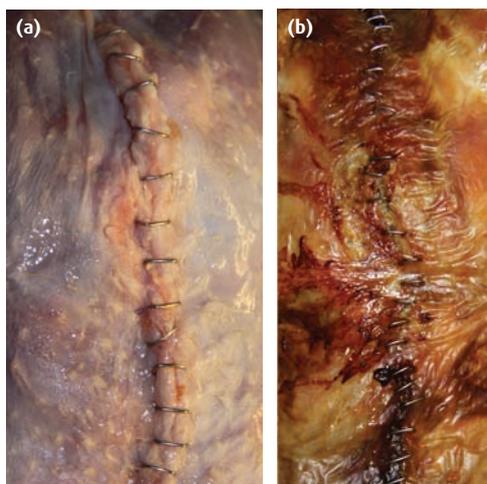


FIG 2: Stuffed turkey closed with skin staples (a) before and (b) after cooking