Surgical anatomy, fashion and the atomic bomb: a controversial word in medical nomenclature

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Abstract

Introduction
Although the word ‘Bikini’ has been repeatedly used in surgical terms in medical literature, these terms seem to remain controversial. The purpose of this communication is to present these cases and to depict some issues that rise by the usage of ‘Bikini’-related terms as anatomical and surgical landmarks in medical nomenclature.

Short communication
The ‘Pfannenstiel incision’, described by the German gynaecologist Hermann Johannes Pfannenstiel, is commonly called the ‘Bikini line incision’ or ‘Bikini cut’. In 1976, Delany and Carnevale described the application of a ‘Bikini incision’ for adaptation to the young female requiring an appendectomy. Temple also reported the use of a ‘Bikini incision’ as an alternative to the McBurney approach for appendicitis. Ersoz et al. reported the use of a ‘Bikini incision’ for anterior approach total hip arthroplasty.

Discussion
Nuclear weapons testing conducted at Bikini and Enewetak Atolls during 1946–1958 resulted in exposures of the resident population to radioactive fallout. A word like ‘Bikini’ that reminds us of a place where testing of such massive destruction weapons took place, seems, in our opinion, inappropriate for medical usage. The variable size and shape of the swimsuit bikini, as well as social controversies regarding this fashion object, are additional reasons for avoiding the use of a term like ‘Bikini’ in medicine. Ambiguous, variable, commerce-related and controversial terms, such as anatomical or surgical landmarks, should be avoided. The existing rich anatomical and surgical nomenclature could provide researchers with adequate alternatives to accurately describe body areas and landmarks.

Introduction
Medical nomenclature is a rich field of words and expressions. Great doctors’ names, doctors’ imagination and rich languages are some of the common origins of such terms. Choosing medical nomenclature may occasionally be a complicated and difficult process. There are some terms that could be considered as ambiguous or even debatable. Furthermore, some terms are not always used with the same meaning by all doctors and differences may exist regarding their understanding among different doctors.

Although the word ‘Bikini’ has been repeatedly used in surgical terms (mainly in Gynaecology and Orthopaedic surgery) in medical literature, we believe that these terms remain, controversial. The purpose of this communication is to present these cases and to depict some issues which, in our opinion, rise by the usage of ‘Bikini’-related terms (Table 1) as anatomical and surgical landmarks in medical nomenclature.

Short communication
The success of any open surgical procedure requires a wisely chosen incision based upon sound anatomical principles¹. The ‘Pfannenstiel incision’ is a type of surgical incision, named after the German gynaecologist Hermann Johannes Pfannenstiel (1862–1909) who first described it in 1900, which is commonly called the ‘Bikini line incision’ or ‘Bikini cut’². It allows access to the abdomen and is commonly used for obstetric delivery and hernia repair³. This low transverse abdominal incision is indeed, mostly because of its decent scar, the incision of choice for most gynaecological operations⁴.

The usage of the word ‘Bikini’ has been reported in surgical nomenclature since 1976 when Delany and Carnevale⁵ described the application of a ‘Bikini incision’ for adaptation to the young female requiring an appendectomy. This incision was designed to allow the use of brief bathing suits

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Table 1. ‘Bikini’-related terms which have been used in surgical anatomy

<table>
<thead>
<tr>
<th>Term</th>
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<tr>
<td>Bikini area</td>
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<td>Bikini crease</td>
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<tr>
<td>Bikini cut</td>
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<tr>
<td>Bikini incision</td>
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<tr>
<td>Bikini line</td>
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and to preserve the normal contoured appearance of the abdominal wall. Temple et al. also reported the use of a ‘Bikini incision’ as an alternative to the McBurney approach for appendicitis. Furthermore, Ersoz et al. reported laparoscopic cholecystectomy on the ‘Bikini line’ with the major advantage of the method being an improved cosmetic outcome with no visible abdominal scars. Recently, Vaidya et al. investigated clinically and anatomically the ‘Bikini area’ and ‘Bikini line’ (connecting the anterior inferior iliac spines) as a location for anterior subcutaneous pelvic fixation. Even more recently, Leunig et al. reported the use of skin crease ‘Bikini’ incision for anterior approach total hip arthroplasty.

Vaidya et al. went further than reporting just a line or an incision, by describing an anatomical region. Their purpose was to describe a subcutaneous anatomical location for rod placement which they labelled as the ‘Bikini line’ and ‘Bikini area’. They interestingly mentioned that the ‘Bikini line’ was visible in most individuals except very thin women and that it was more prominent in individuals who had higher body mass index (due to the related ‘Bikini’ crease of the overlying skin). The ‘Maylard’ transverse muscle cutting incision, preferred by many surgeons because it gives excellent exposure of the pelvic organs, is placed above but parallel to the traditional ‘Pfannenstiel incision’. The Maylard incision is cosmetically advantageous, since it does not scar the midabdomen. Wheelless and Roenneburg described it as a sloping U-shaped incision from the anterior superior iliac spine down slightly superior to the mons pubis to the superior iliac spine on the opposite side. This course is its main difference from the ‘Bikini line’ reported by Vaidya et al.

**Discussion**

Regarding the ‘Pfannenstiel incision’ we think that its name should be retained, honouring the doctor who described it over a century ago. The ‘Bikini incision’ suggested by Delany and Carnevale was designed to allow the use of brief bathing suits, but those suits were dimensionally different four decades ago as compared to those used nowadays. Furthermore, the ‘Bikini line’ described by Leunig et al. defined a line more restricted and slightly more inferiorly placed than those reported by Vaidya et al. Consequently, we notice the variability of this term’s interpretation.

Considering the ‘Bikini line’ described by Vaidya et al. we think that an anatomical/surgical landmark should not be body mass index dependent. Moreover, previous abdominal surgeries, including ‘Pfannenstiel’ and ‘Maylard’ incisions, malformations or abdominal wall trauma may affect the location and shape of the skin crease at the superior border of the ‘Bikini area’ (defined by these authors as the ‘Bikini line’).

The hypogastric (alternative names including hypogastric region, pubic region and suprapubic region) is an area of the human abdomen located below the transtubercular plane. The pubic bone constitutes its lower limit. Inguinal (iliac) regions are located on each side of the hypogastric region. In anatomical terms, the ‘Bikini area’ described by Vaidya et al. could be defined as the subcutaneous part of hypogastric and inguinal (right and left) regions below the line connecting the anterior inferior iliac spines.

Bikini typically refers to a two-piece women’s swimsuit. In May 1946, Louis Réard advertised the bathing suit, known as the ‘Atome’, as the world’s ‘smallest bathing suit’. Réard named his swimsuit the ‘Bikini’ taking the name from the Bikini Atoll, one of a series of islands in the South Pacific where testing on the new atomic bomb was occurring that summer. Historians assume Réard termed his swimsuit the ‘Bikini’ because he believed its revealing style would create reactions among people similar to those created by America’s atomic bomb used in Japan just one summer earlier.

Nuclear weapons testing conducted at Bikini and Enewetak Atolls during 1946–1958 resulted in exposures of the resident population of the present-day Republic of the Marshall Islands to radioactive fallout. The events at Bikini Atoll involved several ships that were tested for durability during nuclear explosions, and 24 vessels now rest on the bottom of the Bikini lagoon. Additionally, a hydrogen bomb explosion test had been conducted in 1954 at the Bikini Island. A word like ‘Bikini’ reminding us of a place where testing of such massive destruction weapons, as those mentioned above, took place, seems, in our opinion, inappropriate for medical usage (at least for usage not related to the tragic consequences that the atomic bomb brought to humanity).

The people of Bikini Atoll, the first displaced people of the nuclear age, were moved from their homeland in 1946 to make way for the testing of 23 nuclear weapons by the U.S. government, beginning with the world’s fourth atomic detonation. The subsequent half-century exodus of the Bikini people included a two-year stay on Rongerik Atoll, where near starvation resulted, and a six-month sojourn on Kwajalein Atoll, where they lived in tents beside a runway used by the U.S. military. In 1948, they were finally relocated to Kili, a small, isolated 200-acre island owned by the U.S. Trust Territory government. Numerous hardships have been faced there, not the least of which was the loss of skills required for self-sustenance. Located 425 miles south of Bikini, Kili Island is without a sheltered lagoon. Thus for six months of the year, fishing and sailing became futile. Because of the residual radioactive contamination from the nuclear testing, the majority of the Bikinian population still resides on Kili today.

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**Short communication**

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One attempt was made to resettle Bikini in the late 1960’s when President Lyndon B Johnson, on recommendations from the Atomic Energy Commission, declared Bikini Atoll safe for habitation. In 1978, however, it was discovered by the U.S. Department of Energy that in the span of only one year, some of the returned islanders were showing a 75% increase in their body burdens of 137Cs. In 1978, the people residing on Bikini were moved again, this time to a small island in Majuro Atoll. In the early 1980’s, the Bikinians filed a class action lawsuit against the U.S. government for damages arising out of the nuclear testing program. Although the claim was dismissed, eventually a $90 million trust fund was established for their local government. Since then, the leaders of the people of Bikini residing on Kili Island and Majuro Atoll have been confronted with the immense responsibility of determining how to clean their atoll while at the same time maintaining the health and welfare of their displaced population.

Regarding the history of swimsuits, bikinis gradually became briefer and lower with narrower sides in the 1970’s. They went briefly again in the early 2000’s as they followed the trend for everything hipster. The bikini has spawned many stylistic variations. Some bikinis can offer a large amount of coverage, while other bikinis provide only the barest minimum. Thus, it is obvious that even the bikini as a suit does not cover a body area of determined borders. Furthermore, bikinis have caused controversies regarding the ‘body ideal’, health aspects, sports as well as cultural controversies. The variable size and shape of the suit as well as the mentioned social controversies are additional reasons for avoiding the use of a term like ‘bikini’ in medicine, even when referring to a popular fashion object.

Summarizing, we consider that the use of ambiguous, variable, commerce-related and controversial terms, as anatomical or surgical landmarks, should be avoided. The existing rich anatomical and surgical nomenclature could provide researchers with adequate alternatives to accurately describe body areas and landmarks.

References