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Prevalence and antimicrobial susceptibility of campylobacter species in chicken carcasses

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ABSTRACT

Campylobacter species are basic bacterial microbes that cause gastro enteritis in people, both in most industrialized and most creating countries. Campylobacter has been recuperated from chicken corpses, poultry meat parts and supplies in preparing plants worldwide. The regularly announced pathogenic species is *C. jejuni* representing over 90% of the cases, trailed by *C. coli* speaking to 7% of the diseases, with the remainder of cases being chiefly *C. lari* and *C. fetus*. The objective of this investigation is to decide the prevalence of Campylobacter spp. in some poultry items by utilizing both traditional and recent strategies. One hundred and twenty chicken samples were gathered from different grocery stores at Menofia governorate (25g of everyone) taken of chicken breast, thigh, liver and gizzard are taken without any pollution or careless. Most examples were debased with Campylobacter spp. Chicken liver indicated the most elevated defilement item (56.67%) trailed by gizzard (53.33%), thigh (30%) and breast (23.33%) gradually. The level of antimicrobial resistance rate of *C. jejuni* to cephalothin, oxytetracycline, erythromycin, nalidixic acid, ampicillin, gentamicin, streptomycin, ciprofloxacin, neomycin, chloramphenicol was 22.2%, 33.3%, 94.5%, 77.8 %, 11.1%, 5.5%, 100%, 44.4%, 61.5 and 44.4% individually

1. INTRODUCTION

Chicken meat industry is the greatest provider of satisfactory creature protein with high meat yield, low shrinkage in cooking and extraordinary wellspring of amino acids, nutrients and minerals (Oulkeir et al., 2017). Campylobacter has been recuperated from chicken corpses, poultry meat parts and supplies in preparing plants worldwide (García-Sánchez et al., 2017). Campylobacter is a zoonotic microbe and is the fundamental driver of human bacterial gastroenteritis in the world (Humphrey and O'Brien, 2007 and Tam and Rodrigues, 2012). The most announced pathogenic species is *C. jejuni* representing over 90% of the cases, followed by *C. coli* speaking to 7% of the diseases, with the remainder of cases being chiefly *C. lari* and *C. fetus* (Moore, et al., 2005). Human *C. jejuni* and *C. coli* contaminations don't contrast with respect to clinical side effects and length of sickness. Nonetheless, patients tainted with *C. coli* will in general be more seasoned than those with *C. Jejuni* (Karenlampi and Rautelin, 2007). The brooding period is two to five days, and the contamination brings about an intense self-restricting gastrointestinal ailment regularly settled in multi week, portrayed by mellow to serious watery/grisly the runs, fever, sickness, disquietude and stomach torment (Blaser, 1997). Mortality rate is inadequately characterized yet low, with passing's ordinarily limited to immuno-traded off patients or those experiencing another extreme illness, for example, entrail malignancy (Allos, 2001). There is extensive epidemiological proof that the main danger factor related with human Campylobacter disease is the presence of this living form in chicken (Sheppard and Dallas, 2009). Campylobacteriosis is regularly self –restricting and does not need antimicrobial treatment. However, in unique cases, for example, septicemia or in the obtrusive types of the infection which described by cut off and delayed enteritis, just as in extremely youthful patients or immunocompromised people, antimicrobial treatment might be required. Macrolides (erythromycin) and quinolones, including fluoroquinolones (ciprofloxacin, nalidixic acid) are typically utilized in treatment of Campylobacter contaminations however as of late there is expanding quantities of safe Campylobacter segregates, particularly to quinolones (Anonymous, 2012). Direct cross contamination, employee, stands and clothes increase the opportunity of campylobacter contamination for carcasses (FAO and WHO, 2002).

2. MATERIAL AND METHODS

2.1. Collection of samples.

An aggregate of one-hundred and twenty diverse chicken samples were gathered from irregular markets at El-Menoufia governorate. Tests comprised of breast, thigh, liver and gizzard. Samples were separately wrapped and put away in coolers (±4C°) and afterward moved to the research facility soon immediately.

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2.2. Preparation of samples in enrichment broth.
25 grams of each sample were aseptically moved to a sterile blender containing 225 ml of Preston enrichment broth for homogenization (Sallam, 2001).
2.2.2. Confinement in specific media for segregation of Campylobacter species, the gathered examples in Preston broth were incubated at 42ºC for 24-48 hours with less than1 cm of the broth headspace with firmly covered cids (Oxoid, 2006). After enrichment, 0.1 ml of the stock was streaked onto adjusted campylobacter specific agar base named Cefoperazone Charcoal Desoxycholate Agar; mCCDA containing CCDA particular supplement .The plates were then incubated 42ºC in dark place for 48 hours under microaerophilic conditions (5% O2, 10% CO2 and 85% N2) utilizing CampyGen sachets (Vandepitte and Verhaegen, 2003).

2.3. Identification of Campylobacter.
2.3.1. Morphological test:
Campylobacter species were exposed to Gram staining, testing of motility (OIE, 2008).
2.3.2. Biochemical tests:
Growth at 25ºC and 41.5ºC, catalase test, oxidase test, vulnerability to nalidixic acid and cephalothin and rapid hippurate hydrolysis test (OIE, 2008).
2.3.3. Serological ID:
It was completed by Oyarzabal et al. (2007), positive samples were serologically analyzed by Latex Agglutination Test.
2.3.4 Antibiogramme for antibiotic sensitivity of Campylobacter species:
Antimicrobial vulnerability was tested by the single diffusion method (Luangtongkum et al. 2007) for Campylobacter species.
2.3.5 Molecular recognizable.

3. RESULTS

As appeared in table (1) results revealed that the rate of Campylobacter spp. was positive for all examined samples, the frequency of *C. jejuni*, *C.coli* and *C.lari* were 6.67 %, 10 % and 6.67 % in breast while *C. jejuni*, *C.coli*, *C.lari* and *C. cinaedi* were 13.33%, 6.67 %, 6.67% and 3.33 % in thigh, then *C. jejuni*, *C.coli*, *C.lari* and *C.cinaedi* were 16.67 %, 20 %, 3.33% and 13.33% in gizzard samples, while *C. jejuni*, *C.coli*, *C.lari* and *C.upsaliens* were 23.33%, 16.67%, 10%, 6.67 and 3.33% in liver, respectively. Table 2 Validity of the examined samples of chicken meat and giblets depending on their contamination with C. jejuni was illustrated in tabl2 while the percentages of Antimicrobial susceptibility of C. jejuni strains isolated from the chicken meat and giblets showed in table 3.
The level of antimicrobial resistance of *C. jejuni* to cephalothin, oxytetracycline, erythromycin, nalidixic acid, ampicillin and gentamicin were 22.2%, 33.3%, 94.5%, 77.8 %, 11.1% and 5.5%, respectively (table 4).

Table 1 Incidence of *Campylobacter* strains isolated from the examined samples of chicken meat and giblets (n=30).

Identified strains	Breast		Thigh		Gizzard		Liver	
	No.	%	No.	%	No.	%	No.	%
Campylobacter jejuni	2	6.67	4	13.33	5	16.67	7	23.33
Campylobacter coli	3	10	2	6.67	6	20	5	16.67
Campylobacter lari	2	6.67	2	6.67	1	3.33	3	10
Campylobacter cinaedi	-	-	1	3.33	4	13.33	2	6.67
Campylobacter upsaliens	-	-	-	-	-	-	1	3.33
Total	7	23.33	9	30	16	53.33	17	56.67

N.B. % was calculated according to total number of samples

Table 2 Validity of the examined samples of chicken meat and giblets depending on their contamination with *C. jejuni* (n=30).

Chicken tissues	*C. jejuni* count /25 g*	Accepted samples		Unaccepted samples	
		No.	%	No.	%
Breast	Free	28	93.33	2	6.67
Thigh	Free	26	86.67	4	13.33
Gizzard	Free	25	83.33	5	16.67
Liver	Free	23	76.67	7	23.33
Total (120)		102	85	18	15

*Egyptian Organization for Standardization "EOS" (2005). ES 1090-2005 for frozen poultry and rabbit.

Table 3 Percentages of Antimicrobial susceptibility of *C. jejuni* strains isolated from the chicken meat and giblets (n=18).

Antimicrobial agent	S		I		R	
	NO	%	NO	%	NO	%
Streptomycin (S)	-	-	-	-	18	100
Erythromycin (E)	-	-	1	5.5	17	94.5
Nalidixic acid (NA)	1	5.5	3	16.7	14	77.8
Amikacin (AK)	2	11.1	4	22.2	12	66.7
Neomycin (N)	5	27.8	2	11.1	11	61.1
Cefotaxim (CF)	6	33.3	1	5.5	11	61.1
Sulphamethoxazol (SXT)	7	38.9	2	11.1	9	50.0
Ciprofloxacin (CP)	8	44.4	2	11.1	8	44.4
Chloramphenicol (C)	10	55.6	-	-	8	44.4
Oxytetracycline (T)	9	50.0	3	16.7	6	33.3
Kanamycin (K)	11	61.1	2	11.1	5	27.8
Cephalothin (CN)	12	66.7	2	11.1	4	22.2
Ampicillin (AM)	15	83.3	1	5.5	2	11.1
Gentamicin (G)	16	88.9	1	5.5	1	5.5

Table 4 Antimicrobial resistance profile of *C. jejuni* strains isolated from the chicken meat and giblets (n=18).

NO	*C. jejuni* strains	Antimicrobial resistance profile	MAR index
1	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C, T, K, CN, AM, G	1
2	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C, T, K, CN, AM	0.928
3	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C, T, K, CN	0.857
4	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C, T, K, CN	0.857
5	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C, T, K	0.786
6	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C, T	0.714
7	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C	0.643
8	*C. jejuni*	S, E, NA, AK, N, CF, SXT, CP, C	0.643
9	*C. jejuni*	S, E, NA, AK, N, CF, SXT	0.500
10	*C. jejuni*	S, E, NA, AK, N, CF	0.428
11	*C. jejuni*	S, E, NA, AK, N, CF	0.428
12	*C. jejuni*	S, E, NA, AK	0.286
13	*C. jejuni*	S, E, NA	0.214
14	*C. jejuni*	S, E, NA	0.214
15	*C. jejuni*	S, E	0.143
16	*C. jejuni*	S, E	0.143
17	*C. jejuni*	S, E	0.143
18	*C. jejuni*	S	0.071
Average	0.437		

4. DISCUSSION

Campylobacter spp. are significant zoonotic important of human being risk because of the less infective dose, the conceivably serious sequelae likewise the relationship between certain Campylobacter harmful gene and the cases of clinical disease (Al-Mahmeed et al., 2006). Resistance among Campylobacter spp. led to a possible danger and less protection of human from the antimicrobial agents which decrease the viability of treatment of food borne illnesses, whenever affected by human being (Franklin et al., 2000). Campylobacter resistance from antimicrobial agents has expanded during the previous many years and has gotten a matter of worry concerned human Campylobacter infections (Nachamkin et al., 2002). Higher opposition rates found in developing nations because of rophazard utilization of antibiotics (Albert, 2013). Higher rate of *C.jejuni* was recorded by Abd el Tawab et al.,(2015). Additionally, the current study recorded that the opposition of *C.jejuni* strains to cephalothin was 22.2%. Lower obstruction rates recorded by Oza et al., (2003) and khalil et al., (2015). The resistance of *C.jejuni* to oxytetracycline, erythromycin and nalidixic acid was 33.3%, 94.5 % and 77.8%. higher than got by AbdelTawab et al., (2015), while lower results recorded by Wasfy et al., (2000). In spite of the fact that erythromycin is viewed as the choice medication for treatment of Campylobacter infection, yet it become insufficient because of the increased resistance for this medication in both created and non-industrial nations (Engberg et al., 2001). The above-mentioned results of the current examination demonstrated 52.6% opposition of C. jejuni to erythromycin. Higher outcomes were recorded by AbdelTawab et al., (2015) and Saad (2014), while lower results recorded by Wasfy et al., (2000). Tetracycline have been decided to be the elective medication for the treatment of Campylobacter disease (Trieber and Taylor, 2000). In the current investigation *C. jejuni* strains indicated resistance for oxytetracycline at level of 33.3%. Higher outcomes acquired by Bester and Essack (2012) and Kang et al., (2006). The high antimicrobial opposition rate to tetracycline as medication might be of their utilization in veterinary medication to counteract and control of poultry diseases (Harriharan et al., 2009). Gentamicin is one of the aminoglycosides broadly used for treatment of foundational Campylobacteriosis diseases (Skirrow and Blaser, 2000).

5. CONCULOSION

Chicken liver indicated the most elevated defilement item trailed by gizzard , thigh and breast gradually. The level of antimicrobial resistance rate of C. jejuni to cephalothin, oxytetracycline, erythromycin, nalidixic acid, ampicillin, gentamicin, streptomycin, ciprofloxacin, neomycin, chloramphenicol was 22.2%, 33.3%, 94.5%, 77.8 %, 11.1%, 5.5%, 100%, 44.4%, 61.5 and 44.4% respectively.

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